The Pennsylvania State University

The Graduate School

Department of Civil Engineering

NOTICE: A Tutorial Expert System for Federal Government Notice Requirement Disputes

A Report in

Civil Engineering

by

Robert J. Bullock

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Engineering

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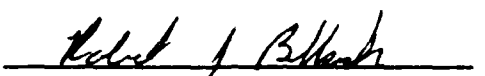

Robert J. Bullock

We approve the report of Robert J. Bullock.

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16 JAN 1989

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16 Jan 1989

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Chapter I

INTRODUCTION

Contract claims are an unacceptable by-product of the construction industry. Claims occur for many reasons: differences in contract interpretation, lack of perfection in the contract documents, failure to accurately estimate the cost of the project, errors in contract administration, acceleration, and delay. The majority of claims originate as disagreements in the field. Many of these claims or disputes could have been avoided by field personnel, given that they possessed ample knowledge about legal theories. Too often disputes are fueled by sharp disagreements between field personnel, who may not be completely knowledgeable about legal precedents and case law relative to their claim.

Employers realize that it is important to educate employees directly involved in the construction contract. Contract administrators, field supervisors, inspectors, architects, and engineers are being educated through construction industry claim seminars. There are also undergraduate and postgraduate courses being offered that address construction contract law.

A new and promising vehicle for educating those that deal with construction contracts and claims is direct instruction via a tutorial rule-based expert system. Most expert systems contain an explanation feature that allows a user to see the chain of reasoning used to make an

inference. The use of this explanation feature by students would allow them to be trained by the expert system through deeper explanation of the rules being used.

Expert systems have been developed in the area of claims analysis. Diekmann and Kruppenbacher have developed a system that provides advice on disputes arising from differing site conditions [3]. Lester developed an expert system that evaluates a construction contract claim in several different areas: delay, suspension of work, disrupted work, differing site conditions, acceleration, termination, and late payment [9]. A common benefit of expert system development, mentioned by both Diekmann and Lester, is the use of expert systems for training novices. The expert system forces the user to go through a rigorous analysis of the claim, sharpening the user's skills in claims analysis.

Problem Statement

There is consistency in legal decisions. Precedents are set, written into case law, and then used in deciding future cases. There are many volumes of case law written relating to construction contracts. From personal experience, contract administrators are generally not aware of the consistency in construction contract claim decisions.

As a result, litigation of contract disputes continues to occur where decisions have been made by the courts.

An area of government construction contracts where disputes have occurred with some regularity is written notice requirements. The government has used the written notice requirement as a primary defense in claims involving changes. Considering the importance of the notice requirement as the government's defense in many Board of Contract Appeals (BCA) cases, there is a need for reliable expert training of contractor and government contract administrators in the area of written notice requirement disputes.

Objectives

The primary objective of this project is to develop an effective and reliable microcomputer tutorial rule-based expert system that addresses Federal Government contract claims involving written notice requirements.

A secondary objective is to demonstrate the application of an expert system as an educational device.

Research Method

The research for this project included a literature search. BCA cases concerning notice requirement disputes

were analyzed. Course work in expert systems and construction contract law supplemented the literature search. The expert system shell EXSYS was reviewed and mastered in order to build an expert system.

The literature consulted included scientific and engineering journals, legal journals, and treatises on construction contract claims. Scientific and engineering journals provided sources of information on knowledge engineering, tutorial expert systems, construction contract expert systems, and the testing of expert systems. Legal journals were a source of review and criticism of legal expert systems. Treatises covering construction contract claims were used as background for notice requirement disputes.

The cases used for this expert system come exclusively from the BCA. The BCA hears only government contract disputes. The notice requirements for changes in government contracts have been the same from 1968 to 1987. The first case involving the 1968 notice provisions was decided in 1971. For this reason, the cases for this report were selected from the 1971 through 1987 Commerce Clearing House (CCH) Contract Appeals Decisions. A total of twenty-four cases were reviewed that dealt with, among other things, notice requirement disputes. The rules considered by the Board and those eventually applied in deciding the case were analyzed and recorded.

The distinction between rules considered by the Board and the rules applied in the decision was important in selecting the rule combinations that were commonly used. Individual cases were reviewed for the Boards' procedures in selecting the rules they applied in making their decision. Rules were extracted based on how the Board chose a subset of rules from a set that supported both sides of the dispute.

The rules from the BCA decisions were entered into EXSYS. Rules were formulated in accordance with the EXSYS users manual [4]. During the construction of the expert system, NOTICE, several scenarios were tried and the conclusions were evaluated. If necessary, rules were modified to improve the conclusions. Finally, an example case was run to demonstrate the performance of NOTICE.

Chapter II

BACKGROUND

This chapter discusses three separate topics that are integrated into one application. The components of an expert system along with the techniques for selecting, building, and testing an expert system are examined. Construction contract claims and the specific issue of notice requirement disputes are discussed.

Expert Systems

Expert systems are a form of artificial intelligence programs which contain knowledge and inference techniques that are used together to solve problems. Denning defines expert systems as "a computer system designed to simulate the problem-solving behavior of a human who is expert in a narrow domain" and further states "expert systems are a way to make knowledge of a few available to many"[2].

Expert System Components

An expert system has four major parts (Figure 2.1): a knowledge base, a global data base, a control structure, and a man-machine interface [7].

Knowledge Base

The knowledge base contains facts, algorithms, and representation of heuristics or rules-of-thumb for problem solving. Often knowledge is represented in the form of production rules: an "If" ... "Then" ... statement. The "If" part of the rule is called the antecedent. The "Then" portion is the consequence. Unlike conventional computer programs, rules in the expert system's knowledge base can be altered without disturbing the other parts of the expert system.

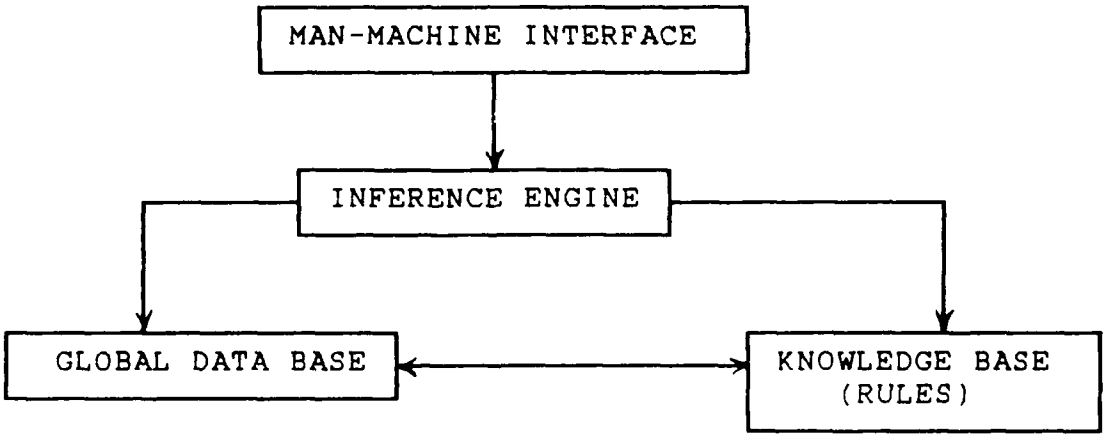

Figure 2.1

Components of an Expert System

Global Data Base

The global data base is the specific data relevant to the problem at hand. This data is either inferred by activated rules of the knowledge base or entered directly by the user. An updated list of rules used for each conclusion is also stored in the global data base. This feature is called rule tracing. Rule tracing is useful in the development phase to check the sequence of rules used.

Control Structure

The control structure or inference engine uses data and facts stored in the global data base to develop conclusions by matching the data to rules in the knowledge base. Figure 2.2 is a diagram of a control structure [6]. The initial data set for a specific problem comes from the global data base. In order to find applicable rules the inference engine employs pattern matching. Here data is matched to the antecedent of the rule. Often there are many antecedents that match the known facts. The manner in which the inference engine selects the one rule to use next is inherent in the system. The system may select the rule that will give the most detailed conclusion, select the most current rule, or select rules at random, but normally the system will select the first applicable rule. The selected rule is then applied or "fired." If the facts do not completely satisfy the antecedent, the system will request

data from the user. Once the antecedent is satisfied, the conclusion derived by the rule will be used to update the global data base and execute any functions in the system. The inference engine will go through the process again,

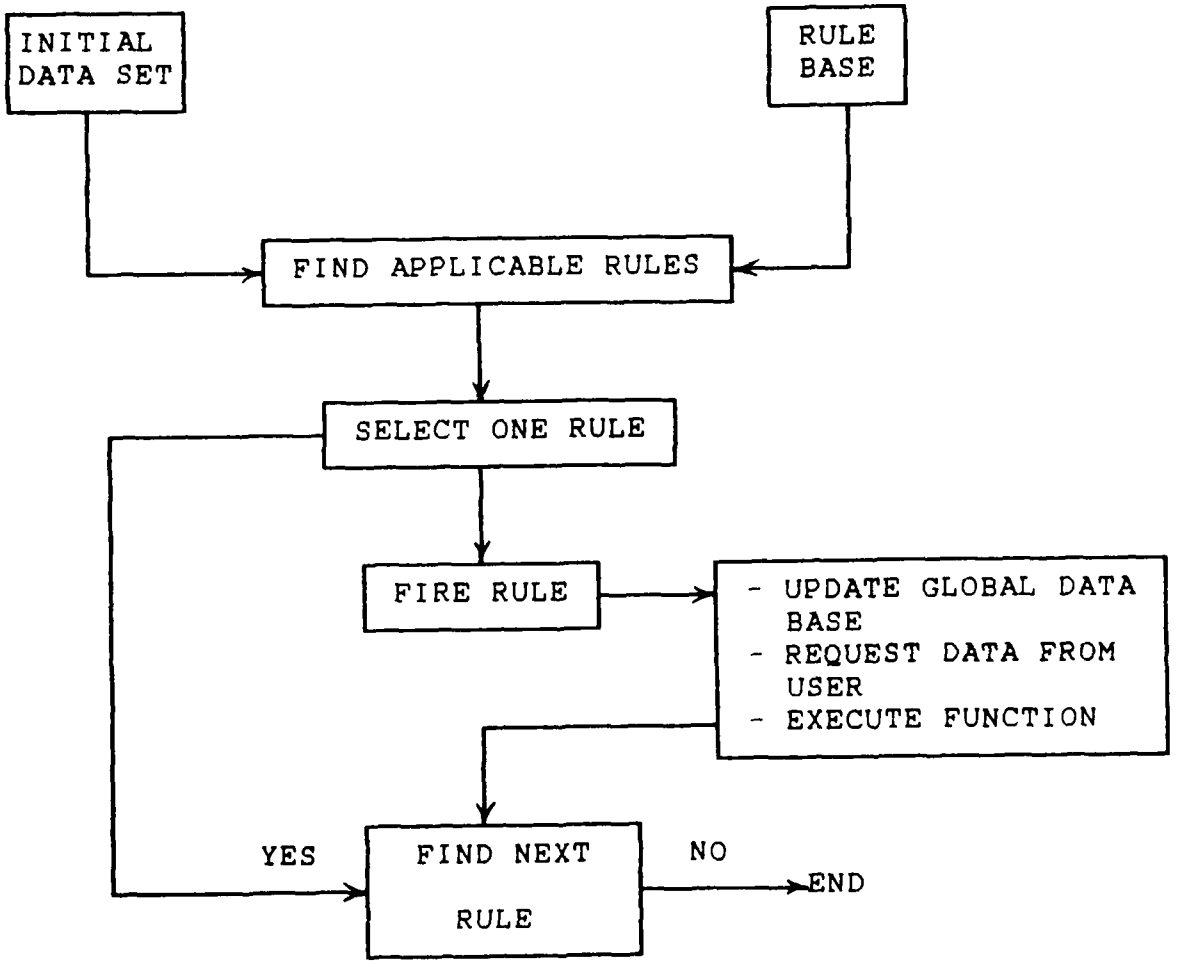

Figure 2.2

Control Structure

searching for rules that satisfy the most recent conclusion. If there are no further matches the system stops.

Expert systems have the ability to reason by using forward or backward chaining or both. Forward chaining is when the system goes from known facts to a conclusion or conclusions supported by these facts. The following example will be used to demonstrate forward and backward chaining [8]:

```
IF      the engine won't turn over
AND     there is no current to the starter motor
THEN    check the battery

IF      the engine turns over
AND     the engine will not start
AND     there is no spark to the plug
THEN    check the distributor cap for dampness

IF      the engine turns over
AND     the engine will not start
AND     there is no fuel at the carburetor
THEN    check that there is fuel in the tank
```

If forward chaining was used on the above rules, the system would ask questions to prove or disprove all of the antecedents. It would ask:

1. Will the engine turn over?
2. Is there current to the starter motor?
3. Will the engine start?
4. Is there spark to the plug?
5. Is there fuel at the carburetor?

Assume that the answers to questions numbers 1, 2, 3, and 4 are "NO" and the answer to number 5 is "YES." The system would conclude that the user should "Check the battery."

Note that all of the rules in the knowledge base are tried when forward chaining is used.

Backward chaining starts with a conclusion or goal. The system attempts to prove that the goal is true by verifying antecedents that support the goal. If the above set of rules were used in a backward chaining system, the system would test the conclusions in the order prescribed by the designer. Assuming the first conclusion to be tested is "Check the Battery", the following questions would be asked:

1. Will the engine turn over?
2. Is there current at the starter motor?

If both answers are "NO", the system would conclude that the user should "Check the battery." The system employed two rules, instead of five, to reach the same conclusion that was made in the forward chaining example. If the answer to one of the above questions was "YES", the system would end the session. The user could opt to have the system pursue another conclusion. It is important to note that there is a chance forward chaining will come up with more than one conclusion, while backward chaining produces a conclusion or gives up in defeat.

Man-Machine Interface

The man-machine interface is the hardware and software that enables the user to communicate with the system. The hardware includes the keyboard, pointing devices, and display. The software can include graphics and tutorials that help the user operate the system.

Knowledge Engineering

Knowledge engineering is the process of extracting knowledge from expert persons or publications and translating it into a form that is usable by a computer. The source of the knowledge, facts, relationships, and heuristics is the domain expert. The person who is extracting and translating the knowledge into rules is considered to be the knowledge engineer. The knowledge engineer creates rules that will allow the expert system to make the same inference as those made by an expert, given the same input. Even if the input and output is correct, the rules and reasoning used by the expert system will not necessarily be the same as that of the domain expert.

Often there are many domain experts. Extracting knowledge from multiple experts requires either a method of determining the best knowledge collected from the experts, or a method of including all of the experts knowledge in the

system. Ashley, Stokes, and Perng offer a qualitative method for combining multiple experts assessments [1].

Problems Suited for Expert Systems

The basic requirements of a problem suitable for solution by an expert system are summarized by Waterman [13]:

1. Experts are needed to solve the problem.
2. Conventional computer programs could not be efficiently used to solve the problem.
3. An expert exists in the domain.
4. There is a need to capture and store the expertise.
5. There is a benefit to solving the problem.

Waterman also addresses the types of problems that are appropriate for expert systems. The tasks should require symbol manipulation; that is to say the problem should require verbal reasoning and representation, not solely relying on mathematical algorithms for solution. The task must require heuristic solutions, the task should not be too easy, it should have practical value, and be narrow in scope so that it is manageable.

Testing Expert Systems

The test for the reliability of an expert system can be either objective tests considered formal methods or subjective testing which are considered informal methods such as case studies and interactive simulation. Although objective tests characteristic of logical proofs and statistical evaluation are rigorous and provide numerical output, these results may not be a good measure of an expert system.

A subjective test of comparing the result to an actual case does allow one to observe, in general, how the expert system performed in a real situation.

Expert System Shells

A shell is software that allows an expert system to be developed without having to be versed in a language typically used to write an expert system: LISP or PROLOG. The shell consists of a man-machine interface, knowledge base, and an inference engine.

In the knowledge base of a shell is a knowledge representation scheme that translates the knowledge engineer's rules, which are entered in a natural language, to a form understandable by the computer. There is normally

a text editor and associated instructions that help the knowledge engineer to enter the rules properly.

A shell inference engine is fixed; it can not be altered by the user or the knowledge engineer. The method of reasoning and the method for selecting the sequence rules to be applied can not be changed by the knowledge engineer, the domain expert, nor the user.

The man-machine interface consists of instructions on how to use the software and how to use a specific expert system. During a session with the system, questions are displayed on the monitor in natural language. At the end of the session conclusions and facts are shown to the user. Most expert system shells have an explanation feature. This will show the rules applied during the session along with the conclusion derived based on the facts that were known or given.

EXSYS

The shell used in this study was EXSYS. It is capable of both forward and backward chaining. EXSYS rules can use the relative probabilities of a choice being correct. This allows the user to respond with more flexibility. The rules are constructed using IF, THEN, AND/OR, and ELSE statements. The user's input is determined by selecting one or more answers from a list provided by the system, or entering data

requested. The system's output can be in the form of either a single solution or a list of possible solutions arranged in order of likelihood. During a session the user can get a rule explanation by asking "WHY." The system will show the rule currently being considered which addresses missing information. EXSYS also allows for notes and references to be written with each rule.

EXSYS contains other useful features for the knowledge engineer. Confidence factors can be entered with any part of a rule. Confidence factors can be expressed in three different scales: yes/no, 0 to 10, and -100 to +100. The results using the -100 to +100 confidence factor mode can be either averaged, combined as dependent probabilities, or combined as independent probabilities.

EXSYS has an automatic rule checker. The checker points out conflicting rules during the design of the expert system. This feature can be turned off when not needed. It is very useful in avoiding inconsistency in the system during the early stages of an expert system design.

EXSYS will allow two independent rule bases to be merged. This could be very useful in combining rule bases that are closely related. Also, EXSYS can be merged with the spreadsheet software, LOTUS.

The rule capacity for EXSYS is approximately 700 rules for each 64K of random access memory (RAM). Nearly 5000

rules could be compiled by EXSYS if it were used in a microcomputer system having 640K of RAM.

Claims

A claim, in the context of this report, is any dispute between two contracting parties which is brought to a third party for resolution. Claims often result from differences in contract interpretation by field managers.

The Cost of Claims

A multi-million dollar a year industry exists from resolving construction claims. This industry includes lawyers and consultants who frequently charge over $100/hr for their assistance in preparing for litigation. Once in court both parties also pay high court fees. Consequently, claims result in great expense to contractors and owners. In addition to the money spent in defending a claim, the claims process is also very time consuming. Those who spend the most time resolving claims are the senior executives of the owner's and contractor's organizations. Cases can take over ten years to be resolved through the court system or the Board of Contract of Appeals. Arbitration has been offered as an alternative to the slow court process.

However, arbitration still carries a high price and the final decision can be often unpredictable.

Because of the high cost to both owners and contractors, these parties would benefit from educating field managers in the resolution and avoidance of claims. The frequency of claims should decrease with increased education of field personnel. This education should include the review of past court decisions in areas of the contract that are susceptible to disputes.

Notice Requirement

Insufficient notice of a change by the contractor is often the subject of construction contract claims. The government often uses the lack of explicit written notice as a defense in claims involving constructive change orders. The basis for the defense is found in the Changes clause.

Changes Clause

The Changes clause of the standard government contract contains two notice requirements. The clause, which can be found in the Defense Acquisition Regulations section 7-602.3, states the following:

> "(a) The Contracting Officer may, at any time, without notice stop the sureties, by written order designated or indicated to be a change

order, make any change in the work within the general scope of the contract, including but not limited to changes:

(i) in the specifications (including drawings and designs);

(ii) in the method or manner or performance of the work;

(iii) in the Government-furnished facilities, equipment, materials, services, or site; or

(iv) directing acceleration in the performance of the work.

"(b) Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation, or determination) from the Contracting Officer, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Contracting Officer written notice stating the date, circumstances, and source of the order that the Contractor regards the order as a change order.

"(c) Except as herein provided, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitled the Contractor to an equitable adjustment hereunder.

"(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly: Provided, however, that except for claims based on defective specifications, no claim for any change under (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: And provided further, that in the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.

"(e) If the Contractor intends to assert a claim for an equitable adjustment under this

> clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Contracting Officer a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the Government. The statement of claim hereunder may be included in the notice under (b) above.
>
> "(f) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract."

Although the above clause specifically states that the contractor gives up his right to claim if he does not provide notice to the government of a change to the contract, the interpretation by the courts and boards of the "Changes" notice requirement is not as straightforward. For example Stokes writes the following about notice requirements in government contracts [10]:

> "Both the Changed Condition Clause and the Differing Site Condition Clause includes the requirement that a contractor must notify the owner before proceeding with the changed work. If the contractor proceeds without complying with the notice requirement the contractor may have waived the right for equitable adjustment. However, it is possible that the contractor's claim may not be lost if the owner is aware of the changed condition and no prejudice is otherwise shown by the contractors failure to give timely notification."

The important issues in a notice requirement dispute are whether the government was prejudiced by the lack of notice and whether the government was aware of the changed condition despite the lack of proper notification. Both

government and contractors should be aware of how the courts and Boards of Contract Appeals handle these issues when faced with a dispute over proper notification.

Notice requirement claims is an area of contract problems that is suitable for an expert system. Waterman's five basic requirements of a problem appropriate for an expert system are addressed [13]:

1. BCA judges decide notice requirement disputes. They decide cases by drawing knowledge from a judge or Board's earlier decision, therefore experts are needed to solve the problem.
2. A legal decision requires verbal reasoning and heuristic solution, therefore conventional computer programs would not be efficiently used to solve this problem.
3. The judges are the domain experts.
4. Contract administrators need this expertise so that they may prevent litigation of problems addressed by the Boards.
5. Eliminating needless litigation through education is a benefit of solving this problem.

Chapter III

CASE LAW SYNTHESIS

Data collection consisted of reading Board of Contract Appeals (BCA) Decisions, which embodied the issue of notice requirements. Twenty-four cases (See Appendix B for summaries of cases) were reviewed for the rules applied by the Boards to make their decisions. The decisions ranged from ones based on strict interpretation of the notice requirements to the more contemporary liberal treatment of both apprisal and monetary notice. The cases varied enough in topics, circumstances, and rules to illustrate the state of the law for notice requirements in Federal Government construction contracts.

The selection of twenty-four cases was not based on the principles of pure statistical sampling, but on the mixture needed to describe the history (1971-1987) of the BCA treatment of notice requirements. The more recent cases selected had one of two results: (1) the contractors were granted notice waivers or (2) the government was found to be prejudiced due to a lack of timely notice. The Boards in these cases cited earlier decisions. Some of these earlier decisions were selected to complete the collection of cases used for this study.

The Federal Government contract notice provision is being exclusively explored because of the consistency in the

contract language. Where there may be many "variations on the theme" of notice specifications in private sector contracts, the Changes clause employed by the government has been in existence since 1968 without revision to the notice provisions. The consistency in the contract wording over a sixteen year period allows for evolution of case law that covered many relevant notice issues without the confusion of any subtle variability in the wording of the contract.

Changes Clause In Relation To Notice Requirements

The Changes clause contains two notice requirements. The 20-day notice located in paragraph (e) is called apprisal notice, requiring notice by the contractor within twenty days of a constructive change. The other notice provision, found in paragraph (d), directs the contractor to notify the government of the "general nature and monetary extent" of a written change order. Both of these notice requirements have been discussed by the Boards and have sometimes been treated similarly with only minor differences.

In Hoel-Steffen Construction Co. v. United States, 17 CCF ¶ 81,203, 456 F.2d 160, the court stated:

> The purpose of the 20-day apprisal notice was to "simply...put the government on notice of the government conduct complained about, so that the procurement officials could begin to collect data

> on the asserted increase in cost, and could also evaluate the desirability of continuing the delay causing conduct."

The P & M Cedar Products, 86-2 BCA ¶ 18,947, decision summarized the way the 20-day notice has been treated by the Boards:

> "Where there has been no apprisal notice of any kind [actual or constructive] with respect to some of this claim,...to require the government to prove that it was prejudiced in the absence of any apprisal notice at all either actual or constructive would render both apprisal notice provision...totally without meaning..."
> "Therefore, while the element of prejudice is for consideration in connection with the notice required by paragraph (e) of the Changes clause it does not affect the requirement that the government must have some form of apprisal notice, whether written, oral or constructive, within the time specified in paragraph (d)."

Therefore the test for proper apprisal notice is whether the government had received actual or constructive notice within the twenty days of the change.

The 30-day notice has had more liberal enforcement than the 20-day notice. In a case covering 30-day notice, the government has the burden of proving that it has been prejudiced by the contractor's untimely notification of the cost impact of the change. In Powers Regulator Company, 80-2 BCA ¶ 14,463, the board explained the metamorphosis and current philosophy of the 30-day notice provision:

> "Failure to comply with the 30-day notice requirement will not support an automatic denial of appellant's claim... The thirty-day notice provision came first historically. It rapidly developed an exception so broad that very little was left of the rule: unless the government could demonstrate that late notice was prejudicial to it

> in some way, the notice requirement would be disregarded. The one significant difference between the 30-day notice and the 20-day notice is in the burden of proof of prejudice: for the thirty-day notice the Boards require the Government to prove prejudice, but so far the analogous exceptions for twenty-day notice appear to require the contractor to prove either that the contracting officer knew of the claim or that notice to him would have been useless."

Defective Specifications And Notice Requirements

The first point to consider in a notice requirement claim is whether the change resulted from defective specifications. If the change is a result of defective specifications then apprisal notice is not required, according to the Changes clause quoted earlier. Some contracting parties erroneously believe their change was caused by defective specifications. For this reason a definition and an example would be instructive. Powers Regulator Co. was such a case and provides the following definition and example:

> Defective Specifications are "instances in which a contractor complied with the requirements of specifications only to discover that the result was not what the contract said it should be."

An example would be J.D. Steele, Inc., 65-2 BCA ¶ 5025.

> "Appellant in that case had installed fluorescent lighting fixtures in compliance with the contract specifications, but the lights inexplicably cycled on and off. Changes in the

ballast and other attempts at correction by the contractor did not remedy the problem. The contracting officer then directed additional remedial efforts, and the contractor appealed from that direction, meanwhile proceeding under protest... In the Steele case, as in defective specification cases generally, there was no Government directive to do the work intended; the only direction from the contracting officer was to do the prescribed work correctly. In the midst of performance the contractor concluded that his problem lay in the specification. Much of the work done, and cost incurred, in performing to the defective specification antedated the realization that there was a specification problem... To apply the notice provision of paragraph (d) to a defective specifications claim, then, would be to cut off costs incurred more than twenty days before notice was given--even though the contractor might have incurred such costs in all innocence of the existence of his defective specifications claim. To avoid such unfairness, no twenty-day notice is required of a claim based on defective specifications. But a constructive change based on an incorrect Government direction to the contractor becomes the basis of a claim as soon as it occurs, and the contractor should be able to perceive it as soon as it occurs."

When Notice Requirements Fail

Powers Regulator Co., supra, best outlines the instances when the notice requirements are not strictly followed. These five situations where the written notice requirements fail are as follows:

1. "Written notice is in fact given to the contracting officer, Hoel-Steffen Construction Co. v. United States, 197 Ct.Cl. 561, 456 F.2d 760 (1972)."

2. "The contracting officer has actual or imputed knowledge of the facts given rise to the claim, R.R. Tyler, 77-1 BCA ¶ 12.227."

3. "Notice to the contracting officer would have been useless, Mil-Pak Company, Inc., 76-1 BCA ¶ 13,611."

4. "The contracting officer frustrated the giving of notice, Merando, Inc., 72-2 BCA ¶ 9483.

5. "The contracting officer considered the claim on the merits, Propper Manufacturing Co., Inc., 73-2 BCA ¶ 10,029."

The above exceptions are applicable to both the 20-day and 30-day notices. Each exception will be illustrated below.

Notice is Given

If the contractor had given notice in writing there would be no claim. This is not an instance where written notice was properly given, rather where constructive or non-written notice occurred. This situation is most often illustrated by Hoel-Steffen Construction Co., supra,:

"The notice provisions in contract-adjustment clauses [should] not be applied too technically or illiberally where government is quite aware of the operative facts."

Other examples of this exception are found in Central Mechanical Construction, 85-2 BCA ¶ 18061, and Building Maintenance Corporation, 79-1 BCA ¶ 13,560:

Central Mechanical Construction:

> "Appellant did not protest in writing to the contracting officer until he filed his claims, in each instance after completion of work. He did make repeated complaints to the inspector, who was aware of the problem and that the appellant was being required to perform extra work. The inspector reported these facts to his superior, the base civil engineer, on his daily reports, as the events occurred. Thus the persons directly responsible were fully aware of the facts. We have many times stated that where the responsible government officials are aware or should be aware of the facts giving rise to a claim, then strict compliance with the written notice requirements is not required. The Court of claims has recently held that this principle applies to a 20-day notice provision similar to that contained in the present contracts."

Building Maintenance Corporation:

Since the contractor complained about the problem at the outset of the contract before work commenced, adequate notice was given. The Board ruled:

> "Exclusive advance knowledge of a condition is, we think, ample reason to dispense with requiring the contractor to tell the Government what it already knows."

Another case, Superior Asphalt & Concrete Co., 81-1 BCA ¶ 15,102, gave a narrower definition of when the government has been given notice.

> "Knowledge of operative facts, however, includes more knowledge than awareness by the government that work is being performed or even ordered which the government clearly believes is within the contract."

Actual Or Imputed Knowledge Of The Facts

This situation is often caused when the contractor does not tell the contracting officer of a change but instead notifies one of the contracting officer's field representatives. The Board in Xplo Corporation, 86-2 BCA ¶ 18,869, asserted:

> "The contracting officer's technical representative has a duty to communicate appellants objections to the contracting officer. Any knowledge of a change must be imputed to the contracting officer."

The following are three examples of when the government knew the important facts of the change or they should have been imputed:

> In Xplo Corporation, 86-2 BCA ¶ 18,867 where arrest of key contract personnel caused a change to the contract the Board determined "... the government had actual knowledge of the events giving rise to the claim" because "(1) The arrests were given considerable publicity and (2) the contracting officer's technical representative had recorded pertinent developments in his Daily Field Report."
>
> In ACS Construction Company, 81-1 BCA ¶ 14,933, "The board found that the government was aware of the operative facts of the change because they admitted to the dimension error and that the need to take corrective actions to prevent unnecessary delays was brought to the attention of the [government's] construction manager four months prior to issuance of the change order."
>
> Finally the Board in Mil-Pak Company., 76-1 BCA ¶ 11,836, ascertained that the contractor did "make repeated complaints to the inspector who was aware of the problem and that appellant was being required to perform extra work. The inspector reported these facts to his superior, the base civil engineer on his daily reports, as the events occurred. Thus the person directly responsible were fully aware of the facts. We have many times stated that where the responsible Government officials are aware or should be aware of the facts giving rise to a claim, then strict compliance with the written notice requirements is not required. The Court of Claims has recently held that this principle applies to a 20-day notice provision similar to that contained in the changes clause of the present contracts."
>
> "The contracting Officer says that he personally knew nothing of the problem of the personal property. We think that the knowledge of the base civil engineer and his representatives is imputed to the contracting officer in this situation."

Notice Would Have Been Useless

Notice has been deemed useless by the Board in several ways. For instance, the government may unyieldingly give a directive not covered in the contract. There may have been no alternative to the way the contractor performed the change. Finally, it may have been apparent that the government would not have acted differently than the contractor. Examples of such circumstances are:

> Sante Fe, Inc., 87-1 BCA ¶ 19,527: "A valid changes claim, filed before final payment, should not be barred by a failure to give notice thereof in accordance with the appropriate provisions when it is reasonably certain that the Government would not have acted differently if such notice had been given." Mil-Pak Co., Inc., 76-1 BCA ¶ 11,725.

The Board's application of this rule ruined the Government's defense. This rule demonstrates that the Government must have been aware that a claim was forthcoming when they emphatically refused to allow the contractor to proceed with a method of light fixture installation not barred by the contract.

Other examples include:

> Powers Regulator Co., supra: In the case where the architect was informed but the contracting officer was not directly informed of a change, if the evidence shows that "the contracting officer would have not reacted contrary" to the way the architect did upon being notified, the government has "assumed the risks involved with his [the architect's] decision and must abide by the consequence... In the situation where architects, construction managers, and consultants are hired to help the contracting officer administer the

> contract, this Board held that "the contracting officer cannot insulate himself from the operating level by layers of construction managers, architects, and consultants, then disclaim responsibility for the actions of one of his agents because the contractor failed to give him notice."

In Atlantic Construction Company, Inc., 79-1 BCA ¶ 13,612 the Board found that there was no doubt that the government would not have acted differently if the contractor had put his complaint in writing. It was clear that the Government would have overruled the contractor's objection to doing the extra work no matter if it was in writing or not. The cited rule stating that:

> "[W]e do not feel that a valid changes claim, filed before final payment, should be barred by a failure to give notice thereof in accordance with the appropriate provision when it is reasonably certain that the Government would not have acted differently if such notice had been given."

The Contracting Officer Frustrated

The Giving of Notice

This exception is less common than those previously discussed. Of the twenty-four cases researched, only one example was found, Ionics, Inc., 71-2 BCA ¶ 9030:

> "A contractor was entitled to reimbursement for performing extra work orally ordered by the government, even though he failed to give timely notice under the changes clause that he considered the order a contract change because the government assured him that it would issue a formal change order. The government could not rely on the notice requirement after failing to issue the order. The clause provided that directions, other

than express written change orders, would be treated as change orders only if the contractor gave written notice that he considered such directions to be changes. It also provided that no claim was allowable for costs incurred more than 20 days prior to the date that written notice was given. Relying on the government's assurance, the contractor performed the extra work."

"In these circumstances basic principles of administrative fairness, and in particular the Government's duty not to interfere with the contractor's performance of his contract, prevent the Government from taking advantage of its own inaction. See George A. Fuller Co. v. United States, 1087 Ct.Cl. 70..."

"Under the 1968 clause a contractor's reliance on such promise and his consequent failure of timely compliance with the notice requirements of the changes clause has serious consequences and may deprive a contractor of otherwise valid claims. The instant appeal presents in our view such an instance and, hence, respondent cannot now deny appellant's claim because of an untimeliness which it has predominantly induced."

Contracting Officer Considered The Claim On Its Merits

In this situation the government considers the contractor's claim valid enough to try and negotiate but fails to come to an agreement. The Boards find that the contracting officer can not deny the claim on the basis of notice because he has already considered the claim to have some merit. One example of such an instance is Dittmore-Freimuth Corp v. United States, 182 Ct.Cl. 507, 390 F.2d 664.

Situations Where Notice Requirements Were Upheld

Notice requirements will not be strictly enforced unless the government has been damaged by the lack of untimely notice. There have been cases where the government has successfully demonstrated that a contractor's delay in notice prevented the government from mitigating damages, but these cases are rare.

Prejudice to the government is an important issue in claims involving the 30-day notice, but is also mentioned in 20-day notice claims where the government was not aware of the operative facts at the time of the change. Although the government is not required to prove prejudice in apprisal notice claims, the Board sometimes mentions how the government was prejudiced by not being notified nor being aware of the change as it occurred. One such case is Gloe Construction, Inc., 84-2 BCA ¶ 17,289:

> "A construction contractor's claim for the cost of additional excavation was denied because he had not notified the government of his plans before commencing the work. Rain had softened the bottom of a pond being constructed as a part of a sewage treatment facility. On his own initiative, the contractor removed the resulting muck from the bottom of the pond and replaced it with dry materials. The contracting officer believed, however, that there had been sufficient time to allow the bottom to dry naturally and that the mucking was unnecessary. The contractor did not give the contracting officer an opportunity to exercise his judgement on the matter, and his claim was therefore denied."

Prejudice can come in two forms. As illustrated in Gloe Construction, Inc., supra, the contracting officer demonstrated how he might have minimized or avoided possible extra expenses. The other form of prejudice is when the passage of time obscures the elements that are needed to verify the change. An example of this is John Murphy Construction Company, 79-1 BCA ¶ 13,835:

> "A contractor could not recover on a claim based upon an alleged over compaction of fill because he had not given the government notice of his claim before the appeal, and the government had no constructive notice of his claim. The contractor claimed that he had been required to compact earthen fill to a higher density than called for in the specifications. However, the contractor neither requested density reports nor advised the government upon constructive notice of his claim. Had the contractor raised his claim during performance, the government could have produced the density reports to settle the dispute. The failure of the contractor to raise the claim in a timely fashion did, therefore, prejudice the government."

Another factor that damaged John Murphy Construction Company's claim was the fact that this portion of the claim was not mentioned until the appeal. Although there seems to be no time limit for filing a claim, the contractor should do so before the contract is closed-out to maintain credibility.

An important observation is that prejudice is secondary to the first four exceptions described earlier. If one of those situations occur, the government could not have been prejudiced. The only prejudice is self induced in the case

where the government has been given constructive notice or has the knowledge of the change within or before the required time and does not act. By definition prejudice can not exist if proper notice would not have caused the government to alter the method or cost of the change. The government also can not claim it has been prejudiced in situations where the government frustrated the giving of notice.

The situation that does not take precedence over the prejudice rule is when the government considers the claim on its merits. See Case *19, Appendix B, DeMauro Construction Corporation, 77-1 BCA ¶ 12,511. This Board held prejudice to be more important than the contracting officer considering the claim on its merits. The Board states:

> "The contracting officer did not waive the notice requirement by consideration of the claim on merits. It is true that he did state in his final decision that appellant should have anticipated rock excavation in Lot V, but he also emphasized prejudice from the lack of timely notice."

The contractor can also have his claim denied in the absence of prejudice to the government. Superior Asphalt & Concrete Co., 81-1 BCA ¶ 15,102, (Case *10, Appendix B), is a case that tested each general situation where the notice requirement had failed, in order to demonstrate that the government was not aware of the operative facts. The decision is summarized as follows:

> "Failure to give timely written notice of a claim for additional compensation for the cost of patching a paving base course (after deletion of a prime coat by the government) was not overcome by the fact that the contractor allegedly gave prompt oral notice to the government because there was no evidence that he actually gave oral notice. The contractor contended that there was constant friction between the parties concerning deletion of the prime coat and concerning the government's failure to stop traffic. The government, on the other hand, presented testimony that the contractor did neither give notice of claims asserted in the appeal nor protested the deletion of the prime coat. It also contended that deletion of the prime coat did not affect the condition of the road. Had the contractor objected to the extent alleged, there would have been some record of his protest to the government. Although the notice provision need not be applied too strictly where the government is aware of the facts, knowledge of the operative facts requires more than government belief that the work being performed is within the contract."

Note that prejudice was not mentioned in the above summary nor was it considered by this board in making its ruling.

Summary

This section provides a review of issues relevant to notice requirement claims for the 20-day and 30-day notice provisions found in the Federal Government construction contracts. Initially one must determine if the change resulted from defective specifications. Other important issues are the five instances where the notice provisions have generally failed. Proof of prejudice or damage to the government due to a lack of notice by contractors is a

another key issue in disputes over the 30-day notice limitation and the apprisal notice requirement to a lesser degree.

The courts and Boards have become more liberal over the sixteen years of notice requirement litigation that were reviewed. In Merando, Inc., 71-1 BCA ¶ 8892, (Case #24 Appendix B), the Board made a strict interpretation of the 20-day notice requirement with no mention of exceptions used today. After the landmark United States Court of Claims case, Hoel-Steffen Construction Company v. United States, supra, exceptions and liberal interpretations of both notice provisions were adopted. Table 3.1 shows the outcome of the cases researched. The cases are listed in chronologic order from the most recent to the oldest.

The Board in Powers Regulator Co, supra, best describes the prevalent philosophy behind the notice requirements:

> "Regardless of terminology, the issue is whether the Government has been unnecessarily put at risk--either the risk of additional liability to the contractor or the risk of being unable to prepare and present its defense against the contractor's claim--by the contractor's delay in notifying the Government of pertinent facts."

This Board also offered a remedy to strengthen the current notice requirements in the Changes clause if the contracting officer must be informed of constructive changes. The wording should be changed to read: "absence of a protest to the contracting officer will be fatal to a constructive change claim."

BCA DECISIONS	ACTUAL OR CONSTRUCTIVE NOTICE WAS GIVEN	GOVERNMENT HAD KNOWLEDGE OF OPERATIVE FACTS	NOTICE WOULD HAVE BEEN USELESS	GOVERNMENT FRUSTRATED THE CONTRACTOR'S NOTICE	GOVERNMENT CONSIDERED THE CLAIM ON ITS MERITS	GOVERNMENT WAS PREJUDICED BY A LACK OF TIMELY NOTICE	THE CHANGE RESULTED FROM DEFECTIVE SPECIFICATIONS	THE CONTRACTOR'S CLAIM WAS DENIED
1. ACS CONSTRUCTION 19,609	NO	NO		NO		YES		YES
2. SANTE FE, INC	YES	YES				NO		NO
3. P&M CEDAR PROD.	NO	NO						YES
4. XPLO CORP, 18,869	YES	YES				NO		NO
5. XPLO CORP. 18,868						NO	YES	NO
6. XPLO CORP.. 18,867	YES	YES				NO		NO
7. CENTRAL MECHANICAL	NO	YES				NO		NO
8 GLOE CONST., INC.	NO	NO	NO			YES	NO	YES
9. UNITRANCO, INC.	YES					NO		NO
10. SUPERIOR ASPHALT AND CONCRETE	NO	NO	NO					YES
11. JOSEPH MORTON CO.	NO	NO				YES		YES
12. ACS CONST. CO. 14,933		YES				NO		NO
13. MUTUAL CONST. CO.	YES	YES				NO		NO
14. J.R. POPE, INC.		YES				NO		NO
15. POWERS REGULATOR COMPANY			YES			NO	NO	NO
16. JOHN MURPHY CONST. COMPANY	NO	NO	NO					YES
17. ATLANTIC CONST. CO.			YES	YES				NO
18. BUILDING MAINTENANCE CORP.	YES	YES						NO
19. DeMAURO CONST. CORP.	NO	NO			YES	YES		YES
20. R.R TYLER		YES				NO		NO
21. MIL-PAK COMPANY, INC.			YES					NO
22. DAVIS DECORATING SERVICE		YES						NO
23. IONICS, INC		YES		YES				NO
24. MERANDO, INC.								YES

TABLE 3.1
SUMMARY OF BCA DECISIONS

Chapter IV

NOTICE: A NOTICE REQUIREMENT TUTORIAL EXPERT SYSTEM

This chapter covers the construction and demonstration of the expert system, "NOTICE." Construction includes organizing the knowledge extracted from the BCA cases into the framework of EXSYS. A case study was used to demonstrate how NOTICE operates.

Construction of the Expert System

Building an expert system has two phases according to Freiling [5]. First is the knowledge definition phase. The other is the prototype implementation phase. The following two sections are a discussion of how both phases were used in the development of NOTICE.

Knowledge Definition Phase

In order to construct this expert system, the knowledge used by the Boards in deciding notice requirement disputes was required. Twenty-four cases were investigated, concentrating on the Board's summary found at the beginning of each case. The Board's summary, written discussion, and written decisions relative to notice were the areas which

contained the rules needed in deciding the cases. The important information extracted from each case is presented in Appendix B.

Once the knowledge was extracted from the case, it was organized into levels of increasing detail. A logic network was made for this, the most general level of knowledge (See Figure 4.1 and 4.2). Starting with the most general decision network made it possible to deal with the mechanics of the whole knowledge base by considering only a few rules.

After the rules for the general level of knowledge were corrected, more specific rules were added. It was possible to expand most of the general rules into more than one specific rule. Figure 4.3 is an example of one of the general rules expanded into three more specific rules.

This level of detail was considered to be adequate. Increasing the detail would mean adding hundreds of new rules to the system. Even though the amount of detail would be increased with the addition of more specific rules, it would not be feasible to add the rules necessary to cover all the possible circumstances of a notice requirement claim.

The final step in the knowledge definition phase was representing the knowledge in EXSYS's format. Before a prototype could be started, the EXSYS system had to be

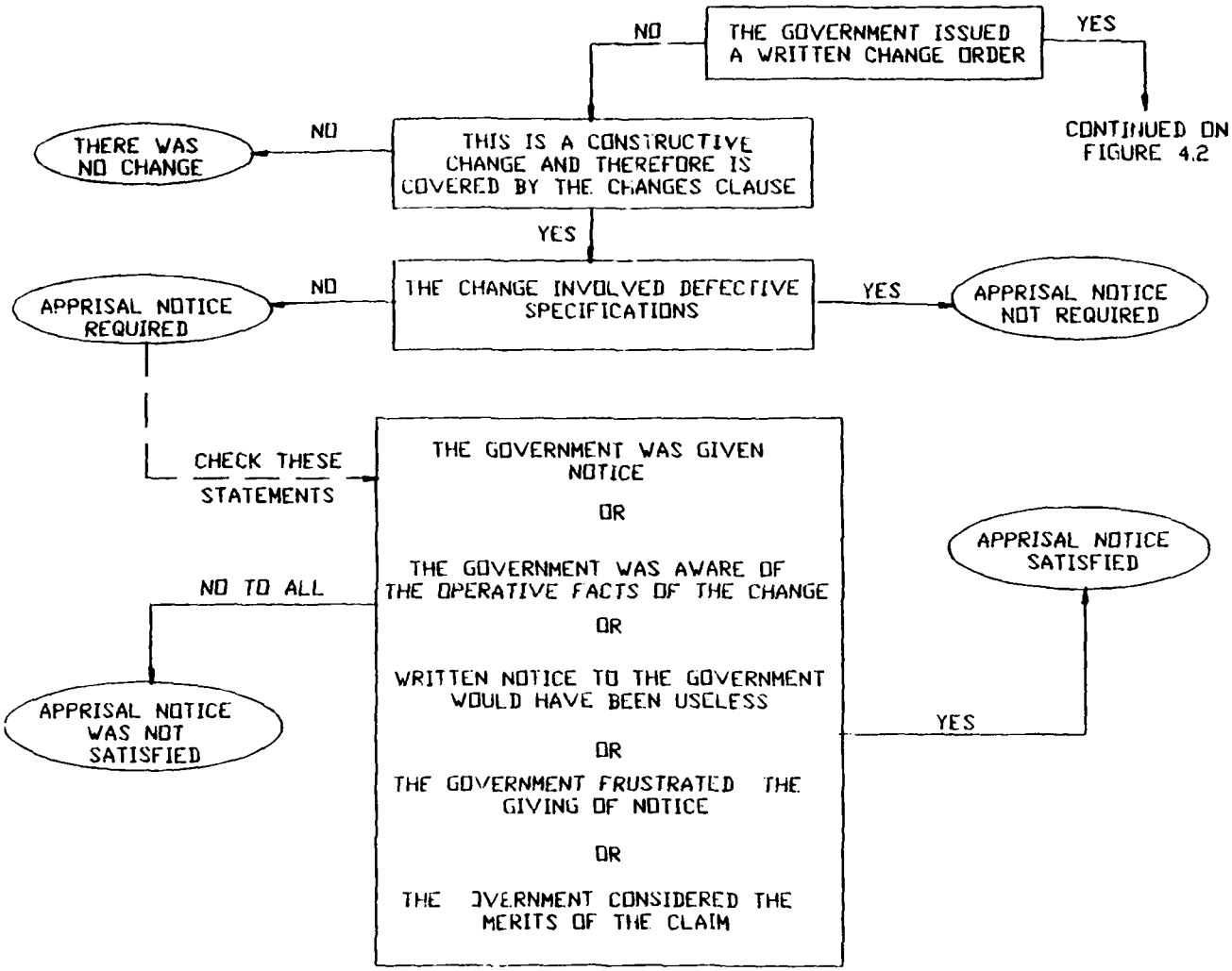

FIGURE 4.1

GENERAL RULES USED FOR APPRISAL NOTICE CASES

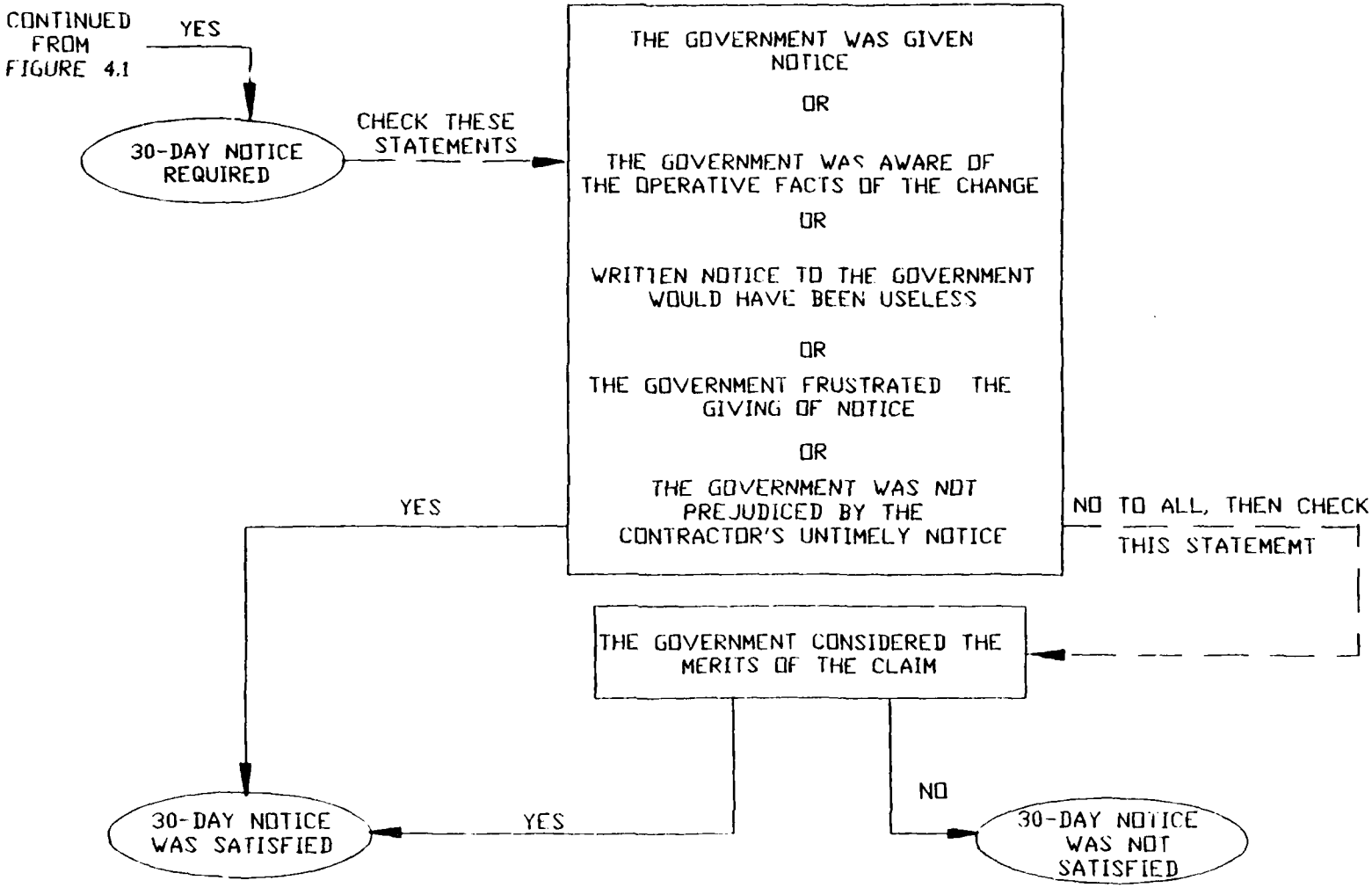

FIGURE 4.2
GENERAL RULES USED FOR 30-DAY NOTICE CASES

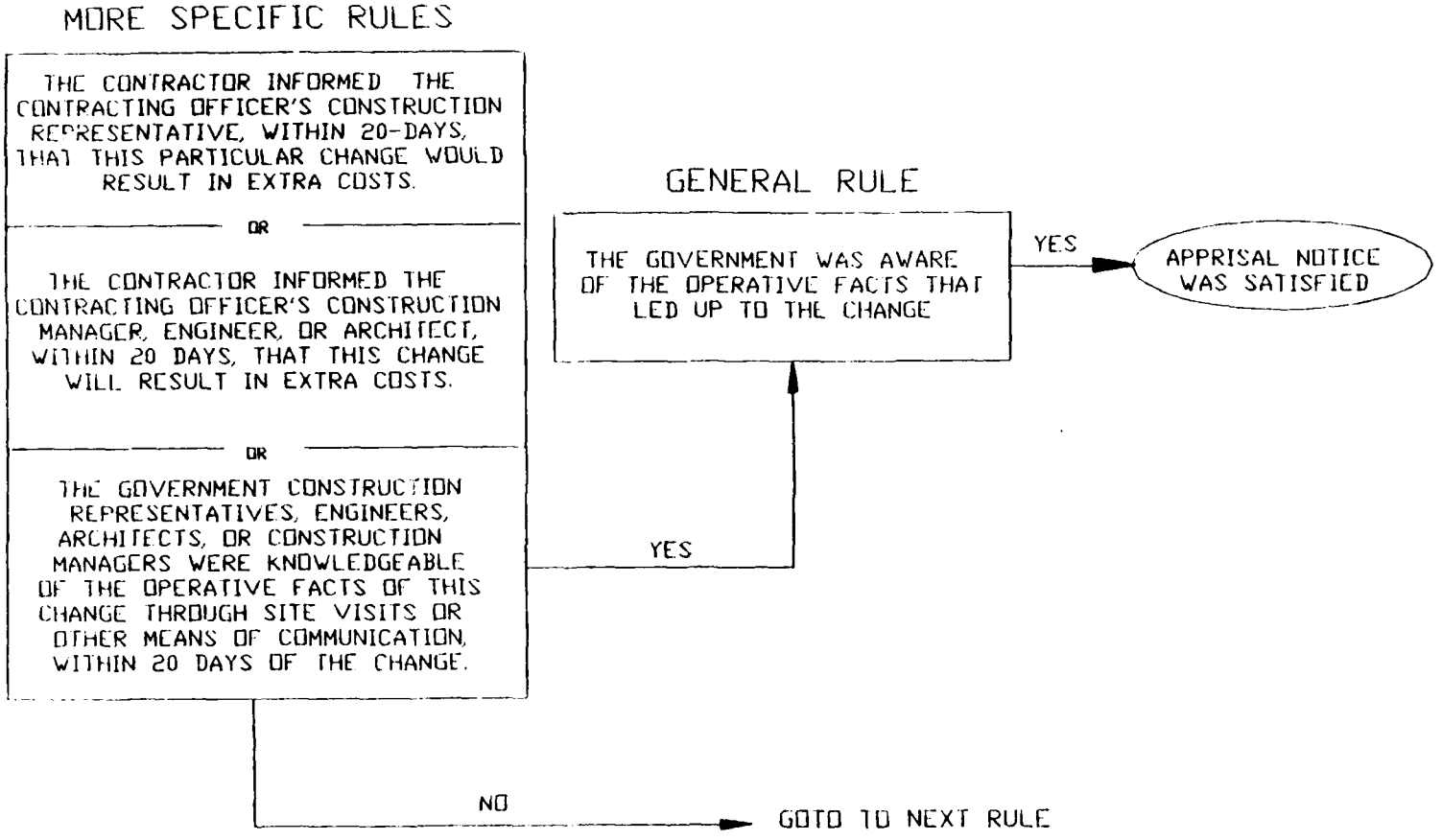

FIGURE 4.3
EXPANSION OF A GENERAL RULE INTO
SPECIFIC RULES

studied to ascertain the proper method for building and entering rules.

EXSYS uses conditions and choices as templates for the formation of each rule. A condition is made up of a qualifier and more than one value. The qualifier is a phrase that ends in a verb. Each qualifier when combined with an option or value makes a sentence. The sentence can be either true or false and must include all possible options of the condition. An example of a condition is:

The government was

1) knowledgeable of the operative facts that led up to the change.

2) not knowledgeable of the operative facts that led up to the change.

In the above case "The government was" is the qualifier and the two phrases for selection are values.

Choices are the other entity used to construct rules in EXSYS. Choices are those goals which the system is trying to prove. The order that the choices are entered into the system dictates how the system will prosecute the rules. The EXSYS inference engine will try to prove or disprove the first choice before searching for the next conclusion and its associated rules. The choices used in Notice are shown in Table 4.4.

TABLE 4.4

CHOICES USED IN NOTICE

	CHOICES
1	This change was caused by defective specifications, therefore apprisal notice is not required.
2	Based on the information provided there has been no change order, therefore apprisal notice is not required.
3	Apprisal notice satisfied.
4	Apprisal notice not satisfied.
5	The contractor did not have to give apprisal notice.
6	30-day notice satisfied.
7	Monetary (30-day) notice was not satisfied.
8	The government was prejudiced by a lack of 30-day notice.
9	The government was not prejudiced by a lack of 30-day notice.

Prototype Implementation Phase

A prototype was first made using the most general knowledge extracted from the BCA cases as previously shown in Figures 4.1 and 4.2. The choices and conclusions were composed, entered into EXSYS, and then used to build the first rules. These rules would become the foundation for the entire system. Rule 6, shown below, is an example of one of these general rules:

IF: The government was knowledgeable of the operative facts that led up to the change

and this change order does require apprisal notice.

THEN: apprisal notice was satisfied - Probability=9/10

and apprisal notice was not satisfied - probability=1/10.

Else: The government was not knowledgeable of the facts that led up to the change.

The IF and ELSE parts of the above rule are created using conditions. The THEN part contains two choices.

The prototype was put through a trial run. The order of rules applied had to be monitored as different scenarios were tried. If the rules were not used in a logical order,

the order of the choices were changed. If the system was not asking a question that it should have been asking, then conditions and qualifiers were entered and new rules were created. This is an iterative process of running the system, scrutinizing the order and content of the questions asked, and then adjusting the order of the choices and the wording of the rules.

Once the prototype was completed using the most general level of knowledge, more detailed rules were entered. Each rule can be linked to one of the general rules already in the system. For example the following rule, rule 19, links to rule 6 above if rule 19 is true:

IF: The contractor did inform the contracting officer's construction representative, within the specified time limit, that this particular change will result in extra cost

and This change order does require apprisal notice.

THEN: The government was knowledgeable of the operative facts that led up to the change.

The system was checked once all the rules were entered. Again NOTICE was put through several trial runs. Facts were changed, rules modified, and order of the choices altered until the scenarios that were tried produced satisfactory

conclusions. The system was logically complete, after this process was satisfied.

The final step in building this prototype was to enter "notes." Notes are displayed with the rule when the user asks the system to explain "WHY" a question was asked. Notes were only added to the rules that generated the questions posed to the user. Questions from internal rules are not seen by the user, therefore there was no need for an explanation note. Notes provide examples and clarification of the rule.

Confidence Factors

A confidence factor must be included when a conclusion is entered into the THEN part of the rule. The confidence factor scale used in NOTICE was 0 (False) to 10 (True). For example the assignment of the factors in rule number 6, shown above, are 9/10 that apprisal notice was satisfied and 1/10 that apprisal notice was not satisfied in the case when the government was knowledgeable of the operative facts. The conclusions were assigned confidence factors based on what was learned from reading the cases. Confidence factors were also assigned based on the validity of the conclusions at the end of the trial runs. Another consideration in assigning confidence factors is that the system will stop pursuing a conclusion when it reaches a 10/10 or 0/10

confidence factor. This is not desirable for a tutorial system, where all of the rules needed to solve a dispute should be shown to the user. For this reason there are many confidence factors that are not at the extremes of the scale. This allows the system to continue exploring other rules containing the same conclusion.

Example Case

The example case selected is a United States Claims Court case which addressed, among other issues, a dispute over untimely notice. The case selected was H.H.O. Co. v U.S., 12 Cl.Ct. 147 (1987).

H.H.O. v U.S. entails, among other things, two contracts having over seventeen claims involving untimely notice and totalling more than $600,000. Both contracts involve Forest Service Road construction contracts. The contracts are identified as the East Six Mile Opted Timber Sale Roads (East Six Mile contract) and the Alligator Opted Timber Sale Roads (Alligator Contract).

The East Six Mile contract was entered into by H.H.O. Company and the Forest Service on 8 July 1983. The contract included road reconstruction and new road construction in the Colville National Forest, Washington. The contract was terminated for default on 9 November 1984 by the contracting

officer for lack of progress by the contractor. H.H.O Company argued that the termination for default was unwarranted and should be converted to a termination for convenience.

On 29 May 1985, over six months after the contract was terminated for default, the contractor submitted ten claims to the contracting officer. Nine claims involved excess quantities of riprap placed on Road 210 totaling $129,765.48. H.H.O Company's tenth claim was for "Alternative Claim O Damages for Breach of Contract" in the amount of $159,166.

The contracting officer's final decision denied all ten claims on the bases of untimely notice by the contractor. He wrote: "This decision is based upon lack of timely notice and presentation of claims after the date of Default Termination; by a defaulted contractor when he had not provided timely Notice prior to the date of default termination." In their defense, H.H.O. presented documentation to show that the contracting officer knew, actually or constructively, of the circumstances underscoring the claims.

The Alligator contract was awarded on 30 August 1982 to H.H.O. Company. The contract was in the amount of $497,707.75 and involved the reconstruction of certain old roads and construction of new roads on the Colville National Forest, Washington. On 3 November 1984, the contract was

partially terminated for default because of H.H.O Company failure to complete certain roads. On 29 May 1985 H.H.O. submitted eight claims. The first seven sought equitable adjustment for issues ranging from "Acceleration Work" to excess "Rock Placement." They totalled $358,325. The eighth claim was an alternative claim for breach of contract. On 25 November 1985 the contracting officer issued his decision, denying H.H.O Company's claims on the bases of untimely notice.

Important facts common to both sets of contract disputes are:

1. The contracting officer did not consider the merits of the claims, but instead denied the claims on the basis that submission of a claim two-hundred and two days after termination was not timely notice.

2. The government believed that it was not given the chance to take any corrective action which it may have deemed necessary.

3. The government did not give examples of what corrective action it would have opted for other than what the contractor had already performed. The government did not prove what alternative action it would have taken if they were given notice.

4. The contractor demonstrated, with much evidence, that the government knew, actually or constructively, of the circumstances underscoring each of their claims.

5. The contractor did not, however, discuss with the government officials the fact that these circumstances would lead to extra costs.

Screen 1 through 18 show how the example case would be examined by the expert system. In situations where facts were not known, the negative answer was chosen.

The critical questions posed by the system are shown in screens 6, 11, and 14. Justification for the answers to these questions are as follows:

Screen 6: The government did not stop the contractor from placing the needed additional riprap along the road. The contractor recognized a need for the additional rock and the government agreed.

Screen 11: The contractor did present evidence, daily diaries and letters, showing that the government "had enough personal or constructive knowledge [of H.H.O. Company's claims on the East Six Mile and Alligator contracts] to have actual of constructive notice

sufficient to decide those claims without prejudice to the government."

Screen 14: The government did not prove that they would have acted differently, if they were notified of the changes in writing. With this answer given, the system found that apprisal notice was satisfied with a probability of 9/10. The contractor, according to NOTICE should not be disqualified for lack of timely notice.

The screens pertinent to the example case are shown below:

SCREEN 1

Welcome to NOTICE! NOTICE is an expert system that will determine the outcome of a notice requirement dispute. This system was developed from the decisions of twenty-four Board of Contract Appeals cases. NOTICE should be used only for those disputes which involve untimely notice as it occurred in federal government contracts.

It is assumed that your dispute or a portion of your dispute involves untimely notice or a lack of written notice of a change. NOTICE only covers instances where the contractor did not comply literally with the notice requirements found in the changes clause of the government's standard contract. Specifically NOTICE can deal with instances where the contractor did not give 20-day written notice, referred to as apprisal notice, for a constructive or non-written change. NOTICE can also address claims where the contractor did not give 30-day notice, referred to as monetary notice, for a written change by the government.

For each question asked by NOTICE there is a positive and negative answer. If you are not sure of the correct response, select the negative answer so that the system continues on the same line of questioning.

SCREEN 2

The government issued

1 a written change order.

2 no written change order.

Answer: 2

SCREEN 3

This change to the contract is

1 an instance when the contractor complied with the specifications but discovered after the completion of the disputed work that the result was not what the contract said it should be.

2 not an instance when the contractor complied with the specifications only to find later that the result was not what the contract said it should be.

Answer: 2

SCREEN 4

An oral change order was

1 given by the government.

2 not given by the government.

Ask: WHY

RULE NUMBER: 10
IF:

(1) An oral change order was given by the government

THEN:

This change is a constructive change

NOTE: An oral change order is any verbal change voiced by the contracting officer, or one of his representatives. The contractor must be able to prove that this verbal change took place. This and three other questions will be used to determine if a change occurred which is covered by the Changes clause.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 5

Oral or written direction was

1 given by the government therefore causing a change to the contract.

2 not given by the government.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 6

An oral or written interpretation was

1 made or agreed to by the government which caused this change to the contract.

2 not made or agreed to by the government.

Answer: 1

SCREEN 7

The contractor gave

1 verbal notice to the contracting officer, Resident Engineer, or Resident Officer, within the specified time limit, alerting him that this change will cause additional cost.

2 no verbal notice to the contracting officer, Resident Engineer, nor the Resident Officer regarding this change.

Ask: WHY

RULE NUMBER : 16
IF:
(1) The contractor gave verbal notice to the contracting officer, or Resident Officer, within the specified time limit, alerting him that this change will cause additional cost

and (2) This change order does require apprisal notice

THEN:
The government was given actual notice in time

NOTE: First the contractor must prove that this verbal notice took place. The specified time limit, in this case, is 20 days after the change occurred. This rule is a test to see if notice was given to the government even though it was not submitted in writing. If the notice was given to someone other than those mentioned here, the answer should be (2); there will be other questions which cover notice to other government representatives.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 8

The contractor did

1 complain to the contracting officer, within the specified time limit, that

this particular change will result in extra cost.

2 not complain to the contracting officer about this change.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 9

The contractor did

1 inform the contracting officer's construction representative, within the specified time limit, that this particular change will result in extra cost.

2 not inform the contracting officer's construction representative, within specified time limit, that this particular change will result in extra cost.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 10

The contractor did

1 inform the contracting officer's construction manager, engineer or architect, within the specified time limit, that this particular change will result in extra cost.

2 not inform the contracting officer's construction manager, engineer, nor his architect, within the specified time limit, that this particular change will result in extra cost.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 11

The government, government construction representatives, engineers, architects, or construction managers were

1 knowledgeable of the operative facts of this change through site visits, daily reports, or other forms of communication, within the specified time limit.

2 not knowledgeable of the operative facts through any means of communication.

Ask: WHY

RULE NUMBER: 21
IF:
(1) The government, government construction representative, engineers, architects, or construction managers were knowledgeable of the operative facts of this change through site visits, daily reports, or other forms of communication, within the specified time limit.
and (2) This change order does require apprisal notice

THEN:

The government was knowledgeable of the operative facts that led up to the change

NOTE: This is a general question compared to those previously posed. It allows one to consider if there was an instance in this dispute where the government or any of its representatives were made knowledgeable of the facts contributing to this change. The following case is an example where publicity in the local news was found to have contributed to the satisfactory notification of the government. In "XPLO Corp.", 86-2 BCA 18,867, where arrest of key construction personnel caused a change to the contract, the Board determined that "the government had actual knowledge of the events giving rise to the claim [because] (1) the arrests were given considerable publicity and (2) the contracting officer's technical representative had recorded pertinent developments in his Daily Field Report."

Answer: 1

SCREEN 12

The government did

1 emphatically give a directive resulting in this change and they were unyielding with regard to alternatives to this directed work.

2 not give a strong directive which resulted in this particular change.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 13

One of the government's technical representatives (architect, engineer, or construction manager) did

1 sanction this change and it is reasonably certain that the government would not have reacted contrary to his technical representative.

2 not sanction this change and/or it is reasonably certain that the government would have reacted contrary to his technical representative.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 14

The government would

1 have acted differently if they were notified in writing of this change or there is not proof to the contrary.

2 not have acted differently if they were notified in writing of this change.

Answer: 2

SCREEN 15

The government did

1 promise to give a written change order but never upheld this promise, therefore causing the contractor to not file written notice within the prescribed days.

2 not promise to give written change order for this change.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 16

It can be shown that the government did

1 nothing that prevented the contractor from submitting written notice for this change.

2 prevent the contractor from giving written notice through their actions.

Answer: 1
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 17

The government did

1 consider the contractor's claim to be valid enough to negotiate the merits of the claim.

2 not consider the contractor's claim to be valid enough to negotiate at any time.

Answer: 2
[Not substantiated by the evidence presented; the negative answer was therefore selected.]

SCREEN 18

The conclusions relating to your case will be shown next. Each conclusion will be listed with a probability between 0/10 and 10/10. As designed, any probability < 5 is unlikely, while any probability > 5 is likely. Initially only those conclusions with a probability of 2/10 or greater will be displayed. To display the entire list, press <A> after the initial list is given. The conclusions that will help determine the outcome of the dispute are: (1) whether apprisal notice was satisfied or not, (2) whether 30-day notice was satisfied or not, and (3) whether the government was prejudiced by a lack of 30-day notice. If either notice requirement was satisfied (probability > 5) then the contractor's claim will probably not be disqualified because of a lack of written notice. If either notice was not satisfied (probability > 5) then the contractor's claim will probably be denied because of lack of notice. Additionally, prejudice to the government resulting from a lack of 30-day or monetary notice is considered by NOTICE. If the government was prejudiced or damaged by a lack of notice or untimely notice, then it is probable that the contractor's claim will be denied.

SCREEN 19

	Values based on 0 - 10 system	VALUE
1	apprisal notice satisfied	9

The conclusion of the court was similar. They ruled in favor of the contractor, however they considered the issue of prejudice. NOTICE does not consider the specific issue prejudice unless there has been a written change order from the government. This is in accordance with the Boards ruling in Powers Regulator Co. and Superior Asphalt and Concrete Co., supra. Although the specific issue is not

considered in apprisal notice cases, the question asked in screen 14 does hint at the idea of prejudice to the government. In situations where the government would not have acted differently if given written notice, the government could not have been damaged or prejudiced. There was no other choice for the contractor than to do the work as he chose to do it.

NOTICE is provided on the attached floppy disk. To load and run:

(1) Put disk in the a: drive.

(2) Type a: <Return>

(3) Type EXSYS <Return>

(4) You will be asked for the expert system file name; type NOTICE <Return>.

(5) Answer the questions posed.

Chapter V

CONCLUSION AND RECOMMENDATIONS

An expert system for Board of Contract Appeals case law covering notice requirement disputes is presented in this report. The preliminary steps for constructing an expert system were shown. This included case research and familiarization with the expert system shell EXSYS. The expert system, NOTICE, was developed and reviewed. Finally, an example case was used to demonstrate the system performance.

Conclusion

The large number of disputes in the construction industry necessitates more awareness of construction contract law. Government and contractors continue to go to court over disputes nearly identical to ones that have already been decided. Educating government contracting officers and contractors about court decisions will help to settle some claims without involving the courts.

This expert system is a viable tool for case law education. By allowing the user to interact with NOTICE, the user sees the combined rules and logic used by the Board to decide notice requirement disputes. Notes found with the rules provide the reasons for the question and examples of

cases where the instant rule was used. The explanation feature adds to the teaching quality of NOTICE.

Difficulties

There were difficulties in developing NOTICE. The BCA cases encompassed many issues other than notice requirements. EXSYS had some shortcomings that hampered the design of a tutorial expert system.

Legal cases are not always straightforward. Claims are normally made up of many issues, not just a single dispute over notice requirements. The Board's written summary and decisions were often clouded by discussions about several issues, making the extraction of rules, pertinent only to notice, difficult. Some of the Boards did not thoroughly treat the issue of the notice because of the overwhelming evidence of other issues nullified the notice dispute.

NOTICE is presently a diagnostic system with extensive notes, not a tutorial expert system. EXSYS was not conducive for building a tutorial expert system. Although there was an explanation feature, it is not readily accessible to the user. The user must ask "WHY" to get an explanation of the question being asked. It would be more instructive if the notes could be displayed at the same time the questions are asked. The length that the EXSYS system designer can make the notes is limited. Graphics are not

available in this system. Longer notes and graphics would enhance the teaching quality of this expert system.

Future Work

This expert system contains the rules necessary to decide a notice requirement dispute. Enhancement to the presentation of the rules are needed. The rules should be entered into a shell that can incorporate graphics and more text for explanations. This would make NOTICE more understandable to the user and, therefore, a better tutorial system.

There are many issues available in construction contract law which could be incorporated in an expert system knowledge base. Such topics, relating to notice, include disputes over changes, differing site conditions, and delay. Ultimately NOTICE should be combined with expert systems that comprise these other contract issues. One knowledge base that contains the case law of government construction contracts could be created. This larger data base would serve as an advisory system to contracting officers and contractor personnel. The intent would be to help guide both parties to a resolution of the claim.

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APPENDIX A

TABLE OF CASES

1. ACS Construction Co., 87-1 BCA ¶ 19,609
2. Sante Fe, Inc., 87-1 BCA ¶ 19,527
3. P & M Cedar Products, 86-2 BCA ¶ 18,947
4. Xplo Corporation, 86-2 BCA ¶ 18,869
5. Xplo Corporation, 86-2 BCA ¶ 18,868
6. Xplo Corporation, 86-2 BCA ¶ 18,867
7. Central Mechanical Construction, 85-2 BCA ¶ 18,061
8. Gloe Construction, Inc., 84-2 BCA ¶ 17,289
9. Robert L. Rich d.b.a. Unitranco, 82-2 BCA ¶ 15,900
10. Superior Asphalt & Concrete Co., 81-1 BCA ¶ 15,102
11. Joseph Morton Company, Inc., 81-1 BCA ¶ 14980
12. ACS Construction Company, 81-1 BCA ¶ 14,933
13. Mutual Construction Co., Inc., 80-2 BCA ¶ 14,630
14. J.R. Pope, Inc., 80-2 BCA ¶ 14,5621
15. Powers Regulator Co., 80-2 BCA ¶ 14,463
16. John Murphy Construction Company, 79-1 BCA ¶ 13,835
17. Atlantic Construction Company, Inc., 79-1 BCA ¶ 13,612
18. Building Maintenance Corporation, 79-1 BCA ¶ 13,560
19. DeMauro Construction Corporation, 77-1 BCA 12,511
20. R.R. Tyler, 77-1 BCA ¶ 12,227
21. Mil-Pak Company, Inc., 76-1 BCA ¶ 11,836
22. Davis Decorating Service, 73-2 BCA ¶ 10,107
23. Ionics, Inc., 71-2 BCA ¶ 9030
24. Merando, Inc., 71-1 BCA ¶ 8892

APPENDIX B

BOARD OF CONTRACT APPEALS CASES

1. ACS Construction Co., 87-1 BCA ¶ 19,609:

"Because a contractor proceeded without government approval to replace unsatisfactory material that underlay a fill area, he was not entitled to an equitable adjustment for the cost incurred in performing the work. The government was awaiting the results of a laboratory test report prior to conducting an inspection of the suspect area at the work site. The fact that the contractor proceeded to replace the unsatisfactory material prior to the government's inspection of the area prevented the government from verifying the claimed replacement work and if it was impractical to bypass the affected area, the contractor still had no justification for proceeding without government approval."

Rules:

1. Since it was not illustrated whether or not there were alternatives to the changed work and the government was not allowed to verify the extent of work that was performed, the Government was prejudiced.

2. Since the Government made no investigation of the changed work while in progress and there were no other sources of information to verify the claimed extent of the

work, the government was not aware of the changed work performed.

2. Sante Fe, Inc., 87-1 BCA ¶ 19,527:

"Because the government would not have rejected a contractor's claim for additional cost even if he had given timely notice of the claim under the Changes clause, the government's contention that the claim should be denied for lack of notice was rejected. Under the circumstances, the government was not prejudiced by the failure to submit a timely notice. Also because the government's on-site technical representatives had actual knowledge of the facts giving rise to a contractor's claim for the additional costs of installing interstitial light fixtures, the contractor's failure to comply with written notice provisions in the Changes clause did not bar his claim for compensation for the additional work. The government argued that any notice by the contractor to its on site representative was casual and ambiguous and that such notice did not comply with the Changes clause notice requirement. However, the board would not enforce the technical notice requirements against him absent a showing of prejudice to the government."

Rules:

1. Casual statements to government representatives to provide contractor only technical assistance does not amount

to notice under the changes clause. Santa Fe, Inc., 84-3 BCA ¶ 17, 538. The board decided that the instant case did not follow this rule since the Veterans Administration's (VA) field engineer and senior engineer were aware of the problem and both have more authority than technical assistance.

2. "Board of Contract Appeals, in practice, will not enforce this technical clause (notice requirement) absent of showing prejudice by the Government. The Government has the burden of proving that prejudice resulted from its lack of written notice. To meet its burden, the Government must demonstrate affirmatively how the passage of time in fact obscured the elements of proof or how the contracting officer might have minimized or avoided possible extra expenses." R. R. Tyler, 77-1 BCA ¶ 12,227.

3. "A valid changes claim, filed before final payment, should not be barred by a failure to give notice thereof in accordance with the appropriate provisions when it is reasonably certain that the Government would not have acted differently if such notice had been given." Mil-Pak Co., Inc., 76-1 BCA ¶ 11,725. The Board's application of this rule ruined the Government's defense. This rule demonstrates that the Government must have been aware that a claim was forthcoming when they emphatically refused to allow the contractor to proceed with a method of light fixture installation not barred by the contract.

3. P & M Cedar Products, 86-2 BCA ¶ 18,947:

"Some parts of a claim related to alleged errors in design for timber road construction and consequent inadequate cost allowances were timely, even though they were filed after the contractual time limit, because the government had timely actual notice of the contractor's intention to file those parts of the claim. Other parts of the claim were untimely because there was no evidence that the government had been apprised of such an intention. Before final acceptance of the work a representative of the contractor sent the contracting officer a letter informing him that a claim was being filed for extra costs encountered on three roads. Although the representative was not authorized to make claims for the contractor, his letter was sufficient notice, since notice provisions should not be strictly or illiberally construed when the government is aware of the operative facts. While the government was aware that the contractor had had difficulties in completing other roads too, that awareness by itself did not amount to actual or constructive notice of an intention to submit a claim. As to those roads, the contractor's claim was dismissed."

Rules:

1. Apprisal Notice is a requirement for the contractor

to give notice 20 days after and alleged change order by the government.

2. "The notice provisions in contract-adjustment clauses [should] not be applied too technically or illiberally where government is quite aware of the operative facts." Hoel-Steffan Const. Co., v. U. S., 17 CCF ¶ 81,203, 456 F. 2d 760.

3. The purpose of the 20-day apprisal notice was to "simply... put the government on notice of the government conduct complained about, so that the procurement officials could begin to collect data on the asserted increase in cost, and could also evaluate the desirability of continuing the delay causing conduct." Hoel-Steffan Const. Co., v. U. S., 17 CCF ¶ 81,203, 456 F. 2d 760.

4. Where there has been no apprisal notice of any kind (actual or constructive) with respect to some of this claim, "to require the government to prove that it was prejudiced in the absence of any apprisal notice at all either actual or constructive would render both apprisal notice provision...totally without meaning... Therefore, while the element of prejudice is for consideration in connection with the notice required by paragraph (e) of the Changes clause it does not affect the requirement that the government must have some form of apprisal notice, whether written, oral or constructive, within the time specified in paragraph (d)."

4. Xplo Corporation, 86-2 BCA ¶ 18,869:

"A claim for an equitable adjustment for extra work was not barred by lack of written notice pursuant to the Changes and Notice of Delay clauses because the contractor had informed the contracting officer's technical representative by letter that he did not believe the disputed work was required by the contract. Thus the government was aware or should have been aware of the alleged change order and delay. Moreover, in the absences of any evidence that the government was prejudiced by any alleged failure to provide notice, the notice requirement would not be strictly enforced."

Rules:

1. "The essential purpose of the Changes clause notice requirement is to alert the Government to conditions requiring special attention during administration of a particular part of a contract." Building Maintenance Corp., 79-1 BCA ¶ 13,560.

2. "Notice requirements will not be strictly enforced unless the Government shows prejudice. Robert L. Rich, d/b/a Unitranco, 82-2 BCA ¶ 15,900."

3. "Within 20 days of the change, the government was informed by letter of a constructive change and that Xplo believed the government was liable for additional costs.

The board therefore decided that the government was aware or should have been aware of the change."

4. "Where the government had actual knowledge of facts pertaining to a constructive change, written notice is not required. J. R. Pope, Inc., 80-2 BCA ¶ 14,562."

5. "The contracting officer's technical representative has a duty to communicate appellants objections to the contracting officer. Any knowledge of a change must be imputed to the contracting officer."

6. "When the government was aware of the delay, and in the absence of a showing of prejudice to the Government by the failure to provide notice, recovery is not precluded. Robert L. Rich d/b/a Unitranco, 82-2 BCA ¶ 15,900."

5. Xplo Corporation, 86-2 BCA ¶ 18,868:

"A contractor's claim for delay and additional cost of excess dredging due to allegedly defective base line information provided by the government was not barred by failure to meet the notice provision of the changes and delay clauses. To the extent that the contractor claimed recovery for defective specifications, the 20 day notice requirement of the Changes clause was inapplicable. If the claim was characterized as one subject to notice requirements, it would not be barred, because the government did not show that it was prejudiced by the alleged lack of notice."

Rules:

1. Paragraph (d) of the contract's Changes clause states in part that no claim, with the exception of a claim for defective specifications, "shall be allowed for any costs incurred more than 20 days before the contract gives written notice" to the contracting officer. In other words if the change is a result of defective specifications then notice is not required.

2. This case was considered to be one of defective specifications. The Coast Guard specified an incorrect angle for surveying the dredging of a channel, therefore causing over dredging which was not apparent to the contractor until after the work was completed.

3. "Government did not demonstrate that it was prejudiced by a lack of notice, therefore the written notice requirement was waived. Robert L. Rich d/b/a Unitranco, 82-2 BCA ¶ 15,900."

6. Xplo Corporation, 86-2 BCA ¶ 18,867:

"A contractor's claim for additional cost incurred because of delay arising from the arrest of the contractor's personnel by city police was not barred for failure to comply with notice requirements of the Changes and Notice of Delay Clauses because the government had actual knowledge of the events giving rise to the claim: (1) The arrests were

given considerable publicity and (2) the contracting officer's technical representative had recorded pertinent developments in his Daily Field Report. The government failed to show how they were prejudiced. Recovery was not precluded by the failure to provide notice."

Rules:

1. "The essential purpose of the Changes clause notice requirement is to alert the Government to conditions requiring special attention during administration of a particular part of a contract. Building Maintenance Corp., 79-1 BCA ¶ 13,560."

2. "Notice requirements will not be strictly enforced unless the Government shows prejudice. Robert L. Rich, d/b/a Unitranco, 82-2 BCA ¶ 15,900."

3. "If within the allotted time for notice, details of the change were in the contracting officer's technical representatives Daily Field Report and the reports are imputed to the Contracting Officer, the government was aware of the change. Davis Decorating Service, 73-2 BCA ¶ 10,107."

4. "Where the government had actual knowledge of facts pertaining to a constructive change, written notice is not required. J. R. Pope, Inc., 80-2 BCA ¶ 14,562."

5. "When the government was aware of the delay, and ir the absence of a showing of prejudice to the Government by

the failure to provide notice, recovery is not precluded. Robert L. Rich d/b/a Unitranco, 82-2 BCA ¶ 15,900."

7. Central Mechanical Construction, 85-2 BCA ¶ 18,061:

"The government's motion for summary judgement was denied because the contractor's failure to comply with the notice provision under the Changes, Differing Site Conditions, and Suspension of Work clauses did not require denial of his appeals. The contractor admitted that he failed to comply with the notice requirements; the government argued that this failure should disqualify the contractors appeals. However, automatic denial was not required. Further, with respect to the Differing Site Condition clause, the contractor's failure to give written notice did not defeat his claim, inasmuch as he had given oral notice of it, which waived the requirement for written notice."

Rules:

1. Failure to comply with the 30-day notice requirement will not support an automatic denial of appellant's claim. "The thirty-day notice provision came first historically. It rapidly developed an exception so broad that very little was left of the rule: unless the government could demonstrate that late notice was prejudicial to it in some way, the notice requirement would

be disregarded. Powers Regulator Company, 80-2 BCA ¶ 14,463.

2. The requirement for prejudice is not the only exception to the thirty-day notice. If the contracting officer considers the claim on the merits he is deemed to have waived the notice requirement. Dittmore-Freimuth Corp v. United States, 182 Ct.Cl. 507, 390 F.2d 664.

3. "There are cases which the government has successfully demonstrated that a contractor's delay in giving notice has prejudiced it but these are comparatively rare." Eggers & Higgens v. United States, 185 Ct.Cl. 765, 403 F.2d 664.

4. There is also a 20-day notice requirement as set forth in paragraph (d) of the Changes clause. The following ruling applies to the 20-day notice limitation:
"Appellant did not protest in writing to the contracting officer until he filed his claims, in each instance after completion of work. He did make repeated complaints to the inspector, who was aware of the problem and that the appellant was being required to perform extra work. The inspector reported these facts to his superior, the base civil engineer, on his daily reports, as the events occurred. Thus the persons directly responsible were fully aware of the facts. We have many times stated that where the responsible government officials are aware or should be aware of the facts giving rise to a claim, then strict

compliance with the written notice requirements is not required. The Court of claims has recently held that this principle applies to a 20-day notice provision similar to that contained in the present contracts. Hoel-Steffen Construction Company v. United States, 197 Ct.Cl. 561 (1972). The several Boards of Contract Appeals decisions indicating a more literal approach were issued prior to that opinion.

8. Gloe Construction, Inc., 84-2 BCA ¶ 17,289:

"A construction contractor's claim for the cost of additional excavation was denied because he had not notified the government of his plans *before* commencing the work. Rain had softened the bottom of a pond being constructed as a part of a sewage treatment facility. On his own initiative, the contractor removed the resulting muck from the bottom of the pond and replaced it with dry materials. The contracting officer believed, however, that there had been sufficient time to allow the bottom to dry naturally and that the mucking was unnecessary. The contractor did not give the contracting officer an opportunity to exercise his judgement on the matter, and his claim was therefore denied."

Rules:

1. "The government did not order the contractor to demuck the lagoon. Moreover, as a basis for its claim, appellant is not able to rely on either its 20 October letter requesting a time extension or its 21 October letter which provided notice that it considered the demucking effort to be a contract change. Appellant pumped the water out of the lagoon on 20 October and immediately started its demucking operations without providing the Government a reasonable opportunity to respond to its claims for money or to grant a time extension. In this case the government did not know about the alleged change since it was uncovered and corrected on the same day and the government only became aware of the problem after the change was completed. The court also believed that since there was the alternative of letting the muck dry, the government would be prejudiced by paying for the demucking operation."

9. Robert L. Rich d.b.a. Unitranco, 82-2 BCA ¶ 15,900:

"Because the government canceled a preconstruction conference and scheduled it for the next day, commencement of work was delayed one day. Based on the criticality of the information that was to be disseminated at the preconstruction conference, it was reasonable for the contractor to have held his workers at another location until he knew the conference was rescheduled. The fact that

the contractor did not notify the government within the required twenty days did not preclude recovery under this claim."

Rules:

1. "Unitranco did not provide the government with written notice of the suspension within the twenty day period specified in the clause. Since the evidence clearly demonstrates that the government was aware of the delay [the government cancelled the meeting and work could not start until after the completion of the preconstruction meeting], and in the absence of a showing of prejudice to the government, by the failure to provide notice, recovery is not precluded."

10. Superior Asphalt & Concrete Co., 81-1 BCA ¶ 15,102:

"Failure to give timely written notice of a claim for additional compensation for the cost of patching a paving base course (after deletion of a prime coat by the government) was not overcome by the fact that the contractor allegedly gave prompt oral notice to the government because there was no evidence that he actually gave oral notice. The contractor contended that there was constant friction between the parties concerning deletion of the prime coat and concerning the government's failure to stop traffic. The government, on the other hand, presented testimony that

the contractor did neither give notice of claims asserted in th. appeal nor protested the deletion of the prime coat. It also contended that deletion of the prime coat did not affect the condition of the road. Had the contractor objected to the extent alleged, there would have been some record of his protest to the government. Although the notice provision need not be applied too strictly where the government is aware of the facts, knowledge of the operative facts requires more than government belief that the work being perfcrmed is within the contract."

Rules:

1. If there is a belief on the part of the government that the alleged change was part of the contract and the contractor did not make the government aware that the work was a change and the government has no reason to believe that the work was a change then this board found that the notice requirement holds. This ruling was made despite the fact that the contractor stated that he had repeated arguments with the government on the subject of the alleged changed work. The government stood by its position that the alleged change was part of the contract. Despite documenting other changes and discussions the government had no record of discussions on this alleged change nor did they state that they ever had such conversation with the contractor.

2. The rule that the contractor cannot do work not required by the contract without registering a protest and then later make a claim against the government, holds true "where, as here the contractor has not complied with the 20-day written notice requirement contained in the changes clause of the contract and there are no extenuating circumstances amounting to actual or constructive notice." R. R. Tyler, 77-1 BCA ¶ 12,2237. "We reaffirm our holding in the Tyler decision that it is unnecessary for the government to show prejudice where the 20-day notice provision has not been complied with either actually or constructively."

3. "It is recognized a notice provision need not be applied too technically and illiberally where the government is quite aware of the operative facts." Hoel-Steffen Construction Co. v. United States, 197 Ct.Cl. 561. "Knowledge of operative facts, however, includes more knowledge than awareness by the government that work is being performed or even ordered which the government clearly believes is within the contract."

4. "A delay of approximately two years in pressing the claim may alone raise position as to appellant's claim, Dittmore-Freimuth Corp., 182 Ct.Cl. 507. Even if it were assumed the appellant advised some government employees of its objection to performing the work, its conduct thereafter [not submitting a claim or any other correspondence for two

years] leads to reasonable conclusion that the claim was waived or the appellant became convinced it was not entitled to recover, Singer Company v. United States, 215 Ct.Cl. 281."

5. "In any event we find an omission of apprisal notice of any kind and that by this omission the government was denied the opportunity to consider alternative action or to measure the actual amount of additional work. The situation is distinct from circumstances where the government is not prejudiced by a lack of information regarding costs."

6. "There is authority for the proposition that notice need not be given if it is reasonably certain that the government would not have acted differently if such notice had been given, Mil-Pak Co., 76-1 BCA ¶ 11,725 (1976). We neither adopt nor reject this principle but rather conclude the government's conduct in allowing substitution of materials [in other instances in this contract], removes the possibility of any certainty the government would not have acted differently had notice been given during the crucial period."

11. Joseph Morton Company, Inc., 81-1 BCA ¶ 14,980:

"A contractor was entitled to an equitable adjustment for removal of air duct not shown on contract drawings provided the government had notice or actual knowledge of

the presence of the concealed ductwork. During renovation of a U.S. Court House the contractor discovered existing ductwork not shown on contract drawings which interfered with his work. The government contended the work was included in the original contract. Although he was entitled to additional compensation for the removal of ducts not shown on the contract drawings, he had to meet the notice burden under the changes and differing site condition clauses. The government had the right to have the opportunity of considering the changes condition, of calculating the value and extent of the changed work to assess its liability and to prepare its defense."

Rules:

1. "Written notice was either given by the contractor, or waived by the contracting officer when he considered the claims in these areas on their merits, Dittmore-Freimuth Corp. v. U.S., 182 Ct.Cl. 507, 390 F.2d 664."

2. A portion of this claim was asserted on the day of the trial. On these items of the claim the contractor's "failure to give the written notice called for by its contract made it impossible for the government to see the work in place. The government was deprived of its right to assess the nature and extent of [the contractor's] claims and to prepare its defense against them."

12. ACS Construction Company, 81-1 BCA ¶ 14,933:

"A construction contractor was not foreclosed from claiming a time extension for a change order, even though he failed to request the extension on time and as provided in his contract, because he had reserved his right to request a time extension, because government was aware of the operative facts requiring the change, and because no prejudice to the government was established. Notice provisions in contract adjustment clauses generally are not to be applied too technically and strictly when the government is aware of the operative facts. The need for the particular change stemmed from a dimension error in the contract drawings, and the government was aware of this fact as well as the fact that the necessary change would possibly cause delays in work. The contractor's claim that he had reserved his right to request a time extension was reasonable, given prior instances in which the government had agreed to the reservation and the possibility of some overlap in delay."

Rules:

1. "Notice provisions in contract adjustment clauses generally are not to be applied too technically and illiberally where the government was aware of the operative facts. Hoel-Steffen Construction Co. v. United States, 197 Ct.Cl. 561, 456 F.2d 760." The board found that the

government was aware of the operative facts of the change because they admitted to the dimension error and that the need to take corrective actions to prevent unnecessary delays was brought to the attention of the [government's] construction manager four months prior to issuance of the change order.

13. Mutual Construction Co., Inc., 80-2 BCA ¶ 14,630:

"The site of the contract work concealed an oil dump containing 600 to 700 gallons of subsurface oil. The government contended that the contractor failed to give notice of the condition promptly and in writing as required by the contract. However, the government was aware of the oil sump before award, pointed out to other bidders who made an inspection of the site, and noted the contractor's efforts in removing the deposit during his performance. This constituted sufficient notice."

Rules:

1. "Years ago, in General Casualty Co. of America v. United States, 130 Ct.Cl. 520, (1955), the Court of Claims held that oral notice given to the governments authorized representative was sufficient notice to satisfy the terms of the then current Changed Condition Clause, notwithstanding the clause's explicit requirement that notice of a changed condition be given to the Contracting Officer in writing."

2. "In more recent cases, the Court of Claims has consistently frowned upon overly technical and illiberal applications of the written notice requirements in contract clauses, particularly where the underlying facts were known to the government." Hoel-Steffan Construction Co. v. United States, 197 Ct.Cl. 561.

3. "And even in the absence of notice, we have held that we would proceed to the merits of the claim unless there is some record demonstration that the government has been prejudiced."

14. J.R. Pope, Inc., 80-2 BCA ¶ 14,5621:

"The Contracting Officer's action of requiring the contractor to work under adverse road and weather conditions had the separate and distinct consequence of causing several constructive changes. A constructive change results when: (1) extra work was done beyond the minimum requirements of the contract; (2) an action by a government representative required the contractor to perform work not covered by the contract; and (3) the contractor gave sufficient notice of the change. Items (1) and (2) were clearly satisfied in this case however the contractor did not give written notice of the changes as the "Changes" clause requires."

Rules:

1. "Where the government has actual knowledge of facts pertaining to the constructive change claim, the claim is not precluded by the absence of specific notice itemizing the contractor's claim. Smith & Pittman Construction Co., 77-1 BCA ¶ 12,381."

15. Powers Regulator Co., 80-2 BCA ¶ 14,463:

"Notice of a specification dispute to a supervising architect employed by the government constituted notice to the contracting officer within the meaning of the Changes clause of the contract. The regional architect on the project had the authority to approve or reject the contractor's submittals. The contractor submitted drawings of his proposed installation of a fire alarm system pursuant to a performance-type specification. The submittal was rejected by the architect and the contractor claimed a constructive change to his contract. Under the circumstances, the actual notice of the architect who had authority to issue changes could be imputed to the contracting officer because the architect was the technical expert to the contracting officer and this was a highly technical claim. Thus, the contracting officer would not likely have reversed the architect's decision to reject the submittal. Based on the same logic, a subcontractor's

written claim to the construction manager, who failed to respond, constituted notice of the claim."

This case involves the "distinct issue of whether appellant satisfied the notice requirement of the Changes clause of its construction tracks. It is conceded that formal written notice of these claims was first given the contracting officer more than a year after the disputes had arisen, after appellant had agreed to perform the work as required by the Government's consultant, and after most of the contract work had been completed. Appellant's arguments in an effort to avoid the effect of the notice requirement fall into three broad categories; (1) that the claims involve defective specifications and therefore are not subject to the notice requirement; (2) that the knowledge of other persons can be imputed to the contracting officer; and (3) that no purpose would have been served by giving notice."

Rules:

1. The following exceptions are valid for both the 20-day and the 30-day notice:

a. Written notice is in fact given the contracting officer. "To adopt the Board's severe and narrow application of the notice requirements, or the defendants support of that ruling, would be out of tune with the language and purpose of the

notice provisions, as well as with the court's wholesome concern that notice provisions in contract-adjustment clauses not be applied too technically and illiberally where the Government is quite aware of the operative facts...", Hoel-Steffan Construction Co. v. United States, 197 Ct.Cl. 561, 456 F.2d 760 (1972).

b. "The contracting officer has actual or imputed knowledge of the facts given rise to the claim, R.R. Tyler, 77-1 BCA ¶ 12.227."

c. "Notice to the contracting officer would have been useless, Mil-Pak Company, Inc., 76-1 BCA ¶ 13,611."

d. "The contracting officer frustrated the giving of notice, Merando, Inc., 72-2 BCA ¶ 9483."

e. "The contracting officer considered the claim on the merits, Propper Manufacturing Co., Inc., 73-2 BCA ¶ 10,029."

Rules (d) and (e) were developed for 30-day notice but seem to be applicable to 20-day notice.

"The one significant difference between the 30-day notice and the 20-day notice is in the burden of proof of prejudice: for the thirty-day notice the Boards require the Government to prove prejudice, but so far the analogous exceptions for twenty-day notice appear to require the

contractor to prove either that the contracting officer knew of the claim or that notice to him would have been useless."

2. "Had the contractors timely informed the Government of their difficulties with the specifications, the Government could have taken prompt remedial action and avoided many of the costs for which the contractors sought to hold liable. The prejudice to the Government's interests found in these cases [cases without a notice provision] is the same sort of prejudice that will sustain the Government when it invokes the protection of an explicit notice provision in a contract clause."

3. A rule sometimes applied to claims is that of estoppel for failure to object. In these cases had the contractor informed the government of the constructive change the government could have mitigated its damages.

4. "Regardless of terminology, the issue is whether the Government has been unnecessarily put at risk--either the risk of additional liability to the contractor or the risk of being unable to prepare and present its defense against the contractor's claim--by the contractor's delay in notifying the Government of pertinent facts."

5. According to the Changes clause, if the situation involves defective specifications the contractor is not bound by the notice requirement.

6. Defective Specifications are "instances in which a contractor complied with the requirements of specifications only to discover that the result was not what the contract said it should be." An example would be J.D. Steele, Inc., 65-2 BCA ¶ 5025. " Appellant in that case had installed fluorescent lighting fixtures in compliance with the contract specifications, but the lights inexplicably cycled on and off. Changes in the ballast and other attempts at correction by the contractor did not remedy the problem. The contracting officer then directed additional remedial efforts, and the contractor appealed from that direction, meanwhile proceeding under protest. The Board reviewed the technical issues in detail and concluded:

> "The preponderance of the evidence leads the Board to believe that the difficulty experienced grew out of the design and method of installation prescribed for the four-lamp fixture...
> "Appellant in fact supplied the fixtures the Government prescribed, equipped them with components meeting the specifications, and installed them flush mounted. It thus met the contract's demands and Appellant therefore should not be required to bear the expense of correcting the cycling which ensued."

"In the Steele case, as in defective specification cases generally, there was no Government directive to do the work intended; the only direction from the contracting officer was to do the prescribed work correctly. In the midst of performance the contractor concluded that his problem lay in the specification. Much of the work done, and cost incurred, in performing to the defective

specification antedated the realization that there was a specification problem.

"To apply the notice provision of paragraph (d) to a defective specifications claim, then, would be to cut off costs incurred more than twenty days before notice was given--even though the contractor might have incurred such costs in all innocence of the existence of his defective specifications claim. To avoid such unfairness, no twenty-day notice is required of a claim based on defective specifications. But a constructive change based on an incorrect Government direction to the contractor becomes the basis of a claim as soon as it occurs, and the contractor should be able to perceive it as soon as it occurs."

7. "...unless the Government could demonstrate that late notice was prejudicial to it in some way, the notice requirement would be disregarded." Fletcher Aviation Corp., 74-1 BCA ¶ 4192.

8. "There are cases in which the Government has successfully demonstrated that a contractor's delay in giving notice has prejudiced it, e.g., Eggers & Higgens v. United States, 185 Ct.Cl. 765, 403 F.2d 255, but these are comparatively rare."

9. In the case where the architect was informed but the contracting officer was not directly informed of a change, if the evidence shows that "the contracting officer would have not reacted contrary" to the way the architect

did upon being notified, the government has "assumed the risks involved with his [the architect's] decision and must abide by the consequence."

10. In case where architects, construction managers, and consultants are hired to help the contracting officer administer the contract this Board held that "the contracting officer cannot insulate himself from the operating level by layers of construction managers, architects, and consultants, then disclaim responsibility for the actions of one of his agents because the contractor failed to give him notice."

11. If the contracting officer must be informed of constructive changes, the following wording should be used in the contract: "absence of a protest to the contracting officer will be fatal to a constructive change claim."

12. Filing a claim after substantial completion does not automatically disqualify the claim as long as it satisfy an exception above.

16. John Murphy Construction Company, 79-1 BCA ¶ 13,835:

"A contractor could not recover on a claim based upon an alleged overcompaction of fill because he had not given the government notice of his claim before the appeal, and the government had no constructive notice of his claim. The contractor claimed that he had been required to compact earthen fill to a higher density than called for in the

specifications. However, the contractor neither requested density reports nor advised the government upon constructive notice of his claim. Had the contractor raised his claim during performance, the government could have produced the density reports to settle the dispute. The failure of the contractor to raise the claim in a timely fashion did, therefore, prejudice the government.

Rules:

1. Claims involving notice must be considered for denial on the basis of lack of notice as well as on the basis of substance.

2. Because this portion of the claim only surfaced during the appeal and there was no evidence of constructive notice, the Board found that there was not proper notice by the contractor.

3. Specific test giving the percent compaction instead of a pass/fail result were not requested by the contractor at the time of the compaction work. "Appellant's failure to request the specific results or to advise the Government of a potential claim in connection therewith was prejudicial to the Government. Had it known that Appellant wanted such specific information and considered the lack of it a problem or damaging to appellant's operation, the Government could at that time have given Appellant copies of the reports of the density test...."

4. This Board also mentioned the Hoel-Steffen Construction Co. v. United States case, but because the government was found not to be aware of the operative facts this ruling had no bearing.

5. The following is a discussion of the differences between the 20-day notice and the 30-day notice as presented by this Board:

> "In the case of the 30-day notice, even if the Government has had neither actual nor constructive notice of the general nature and monetary extent of the claim, if it can be shown that the Government has not been prejudiced thereby "the 30-day time limit for the submission of a claim for an equitable adjustment based on a change may be extended by the Government which includes a contract appeals board." Russell Construction Company.
>
> "However, as we pointed out in R.R. Tyler, in the Russell decision "this Board did not address itself to the element of prejudice in connection with its consideration of the 20-day notice requirement, but rather to the question of whether the Government had actual notice of the alleged constructive changes ... the element of prejudice was discussed only in connection with the 30-day notice under paragraph (e)..." The Board concluded without qualification that clause 3 (d) required "that the Government must have had some form of apprisal notice, whether written, oral or constructive, within the time specified in paragraph (d)."

17. Atlantic Construction Company, Inc., 79-1 BCA ¶ 13,612:

"Although a contractor did not literally comply with the Changes clause notice requirements, his legitimate claims were not barred by his failure to file a written claim because he orally notified the government of his objections to the specifications, the basis for his claim,

and the government was not prejudiced by the lack of written notice. The contractor complained to the job inspector on a daily basis concerning work he considered a change, and the government would not have acted differently even had the claims been submitted."

Rules:

1. Because the appellant complained to the job inspector about doing work that was in excess of what was called for in the contract and the inspector told the contracting officer of this complaint, the government was aware of the operative facts of the change at the time of the change.

2. There is no doubt that the government would not have acted differently if the contractor had put his complaint in writing. It is clear that the Government would have overruled the contractor's objection to doing the extra work no matter if it was in written or not. The cited rule states that "we do not feel that a valid changes claim, filed before final payment, should be barred by a failure to give notice thereof in accordance with the appropriate provision when it is reasonably certain that the Government would not have acted differently if such notice had been given." R. C. Herdeen Company, 76-1 BCA ¶ 11,819.

18. Building Maintenance Corporation, 79-1 BCA ¶ 13,560:

"A contractor's claim for an equitable adjustment under the Changes and Differing Site Conditions clause, based on a defective government-furnished generator, was timely because the government knew that its on-site generators provided inadequate electrical power to perform the contract work, and the contractor gave early, frequent, oral and written notice of these problems and of his intent to make a claim. The government argued that the claim was untimely under the 20-day notice provision pertaining to a constructive change. However, the 20-day requirement was a cost cut-off provision not intended to work a forfeiture of a claim. Moreover, five months prior to award of the contract, the government tested the generators and knew of their deficiencies, and the contractor complained of problems with the generators before the work began. Thus, under the Differing Site Condition clause, the government's actual knowledge was ample reason to dispense with the notice requirement. Furthermore, the contractor's claim under the Changes clause was not precluded in the absence of specific notice itemizing the claim, since the government had knowledge of the facts pertaining to it."

Rules:

1. "...the essential purpose of the notice requirement in the standard remedial contract clauses .. is to point to

conditions requiring Government action or alert procurement officials that special attention is needed in administering a particular part of a contract."

2. Hoel-Steffan Construction Co. v. U.S. was also cited here and adhered to.

3. "[A] lack of strict compliance with written notice requirements frequently had been held to be of no consequence where the conduct of the parties indicated that no useful purpose would be served by adherence to rigid formalism. It seems clear that the stimulation of the filing of claims against the Government is not one of the general purposes of such notice requirements." Copco Steel and Engineering Co. v. U.S., 169 Ct.Cl. 601.

4. Since the contractor complained about the problem at the outset of the contract before work commenced, adequate notice was given. "Exclusive advance knowledge of a condition is, we think, ample reason to dispense with requiring the contractor to tell the Government what it already knows."

19. DeMauro Construction Corporation, 77-1 BCA 12,511:

"The government was prejudiced by a contractor's failure to provide notice of his claim for unanticipated rock uncovered during an excavation for a water main because the material was dumped into the ocean where it was dispersed by wave action. The government, therefore, never

had a chance to investigate the contractor's claim. The Changed Condition clause of the contract required written notification of changed condition claims. The clause, however, permitted waiver of the notice requirement if notice were given before final payment. This notice could be waived if there was no prejudice to the government. Since the government could not investigate the accuracy of the contractor's claim and the contractor did not furnish the government with survey notes, the government was prejudiced and the claim was barred for lack of timely notice."

Rules:

1. Prejudice discussed: "There are two obvious ways in which prejudice can occur. One is if the Government is denied the option to change the method of contract performance to reduce the expense of overcoming the unexpected conditions. The other prejudice is that late notice precludes the contracting officer from investigating and verifying the contractor's allegations of changed conditions."

2. This board considers prejudice to be more important than the contracting officer considering the claim on its merits. The board states: "The contracting officer did not waive the notice requirement by consideration of the claim on merits. It is true that he did state in his final

decision that appellant should have anticipated rock excavation in Lot V, but he also emphasized prejudice from the lack of timely notice."

3. "In this case, the respondent was actually prevented from making a proper investigation by lack of timely notice. It had no records of its own of rock quantities in Lot V and could not verify appellant's claimed quantities. The contracting officer was not willing to accept appellant's profiles without such verification. We hold that this claim is barred by lack of timely notice."

20. R.R. Tyler, 77-1 BCA ¶ 12,227:

"A construction contractor's failure to give notice apprising the government that he regarded certain directives of the contracting officer as constructive changes did not defeat his claim for compensation because the government's representatives at the site knew he regarded the work as not required or impossible. Although these officials did not know the contractor intended to file a claim, they had constructive, if not actual notice of the bases for the contractor's objections and the possibility of a claim. This knowledge was imputed to the contracting officer. Failure to give the 20-day apprisal notice required to make the government aware of orders regarded as constructive changes, as distinct from failure to give the 30-day notice required to make the government aware of the general nature

and monetary extent of a claim, may limit the contractor's proof of prejudice. The apprisal notice requirement is satisfied, however, if responsible government officials are aware or should be aware of the facts giving rise to a claim."

Rules:

1. Hoel-Steffen Construction Company mentioned and adhered to again.

2. "The lack of written notice does not preclude the Government and is not fatal to the claim." J.L. Pitts Construction Company, 75-2 BCA ¶ 11,535.

3. The government does not have to prove that it has been prejudiced in the absence of apprisal notice (20-day notice) whether actual or constructive. "Therefore, while the element of prejudice is for consideration in connection with the notice required by paragraph (e) of clause 3 ..., it does not affect the requirement that the Government must have had some form of apprisal notice, whether written, oral, or constructive, within the time specified in paragraph (d).

4. Knowledge of the changes on the part of the contracting officer's on-site representative qualified as sufficient notice.

5. With regard to proving prejudice due to a lack of the monetary notice (30-day notice) the Board states: "The

Government must demonstrate affirmatively 'how the passage of time in fact obscured the elements of proof', or 'how the Contracting Officer might have minimized or avoided possible extra expenses.' Bare assertions [that costs could have been avoided or minimized] are not enough to sustain a finding of prejudice." Electronics & Missile Facilities, Inc., 70-1 BCA ¶ 8074.

21. Mil-Pak Company, Inc., 76-1 BCA ¶ 11,836:

"A contractor's failure to give notice that he was appealing under the Changes clause of his contract to perform construction in post exchange stores did not bar his claim because the government was not prejudiced by the notice failure. Although the ASBCA recognized "the unfortunate division of opinion among Boards of Contract Appeals in this area," the better rule, it held, is that a valid changes claim filed before final payment should not be barred by a failure to give notice when it is reasonably certain that the government would not have acted differently if the notice had been given. In this case, even if the contractor had informed the government that he needed unrestricted access to the store during working hours, it was clear that the government would not have allowed him to disrupt store activity. The original decision (76-1 BCA ¶ 11,725) was therefore affirmed."

Rules:

1. "[W]e do not feel that a valid changes claim filed before final payment, should be barred by a failure to give notice thereof in accordance with the appropriate provision when it is reasonably certain that the Government would not have acted differently if such notice had been given.

"In this appeal, it is clear that the contractor would not have been allowed to disrupt the operations of the main store by working therein during business hours even if a notice pursuant to the Changes clause had been given by the contractor."

22. Davis Decorating Service, 73-2 BCA ¶ 10,107:

"A contractor was entitled to extra compensation for removing building tenants' items of personal property before performing a painting contract because the contract did not explicitly include such activity as part of the contractor's work requirements. Knowledge of the fact of the problem on the part of the contracting officer's technical representative constituted sufficient notice of claim."

Rules:

1. The contractor did "make repeated complaints to the inspector who was aware of the problem and that appellant was being required to perform extra work. The inspector reported these facts to his superior, the base civil

engineer on his daily reports, as the events occurred. Thus the person directly responsible were fully aware of the facts. We have many time stated that where the responsible Government officials are aware or should be aware of the facts giving rise to a claim, then strict compliance with the written notice requirements is not required. The Court of Claims has recently held that this principle applies to a 20-day notice provision similar to that contained in the changes clause of the present contracts." Hoel-Steffen Construction Company v. United States, 197 Ct.Cl. 561 (1972).

2. The contracting Officer says that he personally knew nothing of the problem of the personal property. We think that the knowledge of the base civil engineer and his representatives is imputed to the contracting officer in this situation.

23. Ionics, Inc., 71-2 BCA ¶ 9030:

"A contractor was entitled to reimbursement for performing extra work orally ordered by the government, even though he failed to give timely notice under the changes clause that he considered the order a contract change because the government assured him that it would issue a formal change order. The government could not rely on the notice requirement after failing to issue the order. The clause provided that directions, other than express written

change orders, would be treated as change orders only if the contractor gave written notice that he considered such directions to be changes. It also provided that no claim was allowable for costs incurred more than 20 days prior to the date that written notice was given. Relying on the government's assurance, the contractor performed the extra work."

Rules:

1. " In these circumstances basic principles of administrative fairness, and in particular the Government's duty not to interfere with the contractor's performance of his contract, prevent the Government from taking advantage of its own inaction. See George A. Fuller Co. v. United States, 1087 Ct.Cl. 70..."

2. "Under the 1968 clause a contractor's reliance on such promise and his consequent failure of timely compliance with the notice requirements of the changes clause has serious consequences and may deprive a contractor of otherwise valid claims. The instant appeal presents in our view such an instance and, hence, respondent cannot now deny appellant's claim because of an untimeliness which it has predominantly induced."

24. Merando, Inc., 71-1 BCA ¶ 8892:

"A contractor's claim for additional compensation for

an alleged constructive change concerning the formation of beams was denied because the claim was not timely filed. The new form of Changes clause required that the contractor must give written notice of any changes resulting in increased costs within 20 days of incurring the costs and, within 30 days thereafter the submission of a written statement of the claim and the amount of money involved. Although the contractor disagreed orally with the contracting officer's interpretation of the contract requirements, he filed no written notice of his claim until five months after performing the work which resulted in the increased costs. The claim did not involve a claim that specifications were defective and the contractor was not, therefore, exempted from the Changes clause notice requirements. Although the notice provision under the old Changes clause did not apply to constructive changes, under the new Changes clause the notice requirement does apply to a constructive change. Notice requirements under the new Changes clause are strictly construed and the contractor will be denied recovery in the absence of adequate notice."

Rules:

1. "Pursuant to the old Changes clause, the Board has recognized that the 30-day notice provision does not apply with regard to constructive changes. For example, Carlin-Atlas, 66-2 BCA ¶ 5872. It is likewise well settled that

the 30-day limitation provision in the Changes clause relating to the submission of claims of changes is not applicable where the Contracting Officer has not issued a written change order and where the claims are based on alleged constructive changes"

2. "The notice requirement as set forth in the new Changes clause is very explicit and requires that written documentation be sent to the Contracting Officer which admittedly Appellant failed to furnish. In the interpretation of notice requirements of the suspension-of-work clause, which is similar to the provision of the new Changes clause, the Boards have heretofore strictly interpreted such requirements and denied recovery in the absence of adequate written notice when required by the contact."

3. "See U.S. v. Cunningham, 125 F.2d 28. In this case the court said that failure of the contractor to give proper notice was fatal to his position. The court stated:

> The reasoning in these cases seems to be that a provision in a contract of the nature we are discussing is a condition precedent, compliance with which must be shown; and this is true because it must be assumed that the parties in inserting the provision attached both value and importance to its precise terms. In such circumstances, the court is not at liberty either to disregard words used by the parties, descriptive of the subject matter, or any material incident or to insert words which the parties have not made use of. Harrison v. Fortlage, 161 U.S. 57."